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THESIS

**THE IMPACT OF OBESITY ON NATIONAL
AND HOMELAND SECURITY**

by

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September 2013

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THE EFFECT OF OBESITY ON NATIONAL AND HOMELAND SECURITY

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ABSTRACT

Through a series of policy decisions, innovations, and a growing complex food system, the United States moved from a nation of people considered to be undernourished at one point to a nation with 100 million obese citizens. This radical change in our collective condition took place in less than one generation. This body composition change is impacting military readiness, military recruiting, first-responder readiness, and first-responder recruiting. Further, the impacts of obesity have an annual cost that is estimated to be nearly half a trillion dollars. In our mission to meet both acute and chronic homeland security needs, it is crystal clear that the human and economic burdens of obesity are substantial. Therefore, obesity is a homeland security issue.

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TABLE OF CONTENTS

I.	RESEARCHING AND DEFINING WHAT OBESITY IS AND ITS IMPACTS ON A NATION	1
A.	PROBLEM STATEMENT	1
B.	RESEARCH QUESTIONS	5
C.	LITERATURE REVIEW	5
1.	What is Unknown?.....	11
D.	CONCLUSION	13
1.	Method and Research Design	14
II.	HOW IS OBESITY A HOMELAND SECURITY ISSUE?.....	15
III.	THE MECHANICS AND DYNAMICS OF OBESITY	29
A.	WHAT IS BMI?	30
B.	MEASURING OBESITY	31
C.	CLINICAL RELEVANCE OF BMI.....	33
D.	IS BMI APPLICABLE FOR ALL?	34
IV.	HOW DID WE GET OBESE?.....	35
V.	THE POLICIES AND POLITICS OF OBESITY: WHO MADE U.S. FAT?	45
A.	FRITZ HABER AND THE HABER BOSCH PROCESS	46
B.	NORMAN BORLAUG AND THE GREEN REVOLUTION	48
C.	EARL BUTZ AND THE AGRICULTURAL POLICIES OF THE NIXON ADMINISTRATION.....	51
D.	CORN: THE NEW CASH CROP	53
E.	THE NEW SUGAR/HIGH FRUCTOSE CORN SYRUP (HFCS)	55
F.	THE AMERICAN DIETARY NEEDS AND THE IMPACT OF THE MCGOVERN COMMITTEE.....	57
G.	SUPERSIZE	62
H.	THE EXERCISE MYTHOLOGY	63
VI.	THE FOOD INDUSTRY.....	71
A.	PART I—REDUCTIONISM	71
B.	PART II—THE FOOD INDUSTRY.....	79
1.	The Farm Bill	87
2.	Obesity Increases While Food Is Wasted.....	88
C.	PART III—THE FOOD INDUSTRY	92
1.	Physiological Response to Designed Food	92
D.	PART IV—THE FOOD INDUSTRY	100
1.	The Energy Balance Debate.....	100
E.	PART V—THE FOOD INDUSTRY	106
1.	Culpability or Business Model.....	106
VII.	DON'T SHOOT THE MESSENGER.....	115
A.	CONCLUSION	115
B.	RECOMMENDATIONS.....	121

BIBLIOGRAPHY	127
INITIAL DISTRIBUTION LIST	135

LIST OF FIGURES

Figure 1.	Estimated increased spending associated with obesity in the United States, provided by McKinsey and Associates.....	16
Figure 2.	Crude overall number and percentage of service members who received an outpatient diagnosis of overweight/obesity, by calendar year, active component, U.S. Armed Forces, 1998–2010. Provided by The Armed Forces Health Surveillance Center.....	23
Figure 3.	Spending on Food and Drink by Selected Countries. Source provided by <i>The Economist</i>	41
Figure 4.	Factory Food Image provided from the <i>New York Times</i> business section, April 3, 2010	43
Figure 5.	Projected Obesity rates in 2030. Provided by Trust for America’s Health	67
Figure 6.	The United States increase in obesity. Provided by Data360.org.....	80
Figure 7.	The growing rate of obesity in different BMI categories. Provided by Archives of Internal Medicine, 2003	81
Figure 8.	The CDC Obesity levels in 1985. Provided by the CDC.....	82
Figure 9.	The CDC Obesity levels in 2010. Provided by the CDC.....	82
Figure 10.	Prevalence of Obesity Compared to Percent Calories from Fat Among U.S. Adults. Screen shot provided by a Dr. Robert Lustig lecture	83
Figure 11.	Loss and Waste by Calories and Weight. Provided by UNFAO	89
Figure 12.	The Global Sugar Glut provided by Nature magazine.....	97
Figure 13.	Amount of Soda Consumed per Person by Liter. Provided by Global Market Information	98
Figure 14.	Dollars Spent on health care, per Country	99
Figure 15.	The Increase of obesity over time. Provided by CDC	102
Figure 16.	The increase in adult obesity provided by CDC	103
Figure 17.	Annual World Sugar Consumption provided sugar industry.....	103
Figure 18.	Companies with highest risk exposure due to obesity. Provided by JPMorgan	108
Figure 19.	The Increase of Obesity in the United States. Provided by NuSi.	115

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LIST OF TABLES

Table 1.	A comparison of age groupings and branch of military service.	20
Table 2.	Comparison of United States 2000 and 2010 Census Bureau age groupings. Provided by U.S. Census.	21
Table 3.	Overweight and obesity by percentage of population. Provided by NHANES, 2009–2010.	24
Table 4.	Body Mass Index Table	32

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LIST OF ACRONYMS AND ABBREVIATIONS

AAA	Agricultural Adjustment Administration
ABA	American Beverage Association
ACSH	American Council for Science and Health
ACFN	American Council for Fitness and Nutrition
ADA	American Diabetic Association
AHA	American Heart Association
ASVAB	Armed Service Vocational Aptitude Battery
BMI	Body Mass Index
BMR	Basal Metabolic Rate
BUSM	Boston University School of Medicine
CAFO	Confined Animal Feed Operation
CCF	Center for Consumer Freedom
CDC	Center of Disease Control
CFA	Consumer Federation of America
CCF	Center for Consumer Freedom
CHD	Coronary Heart Disease
CHO	Carbohydrate
CSR	Corporate Social Responsibility
FAO	Food and Agricultural Organization of the United Nations
GED	General Equivalency Degree
GDP	Gross Domestic Product
GMO	Genetically Modified Organisms
HDL	High Density Lipo Protein

HFCS	High Fructose Corn Syrup
LDL	Low Density Lipo Protein
MRI	Magnetic Resonance Imaging
NHLBI	National Heart, Lung, and Blood Institute
NIH	National Institute of Health
NIDDK	National Institute of Diabetes and NIDDM Non insulin Dependent Diabetes Myelitis
OECD	Organization for Economic Co-operation and Development
NPK	Nitrogen, Phosphorus, Potassium
FAO	Food and Agriculture Organization of the United Nations
SNAP	Supplemental Nutrition Assistance Program
RPD	Reno Police Department
ROI	Return on Investment
TNT	Trinitrotoluene
USDA	United States Department of Agriculture
UNEP FI	United Nations Environmental Program Finance Initiative
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

Obesity is a homeland security issue. Through a series of innovations and policy decisions, the United States moved from a nation of people considered at one point to be undernourished to a nation with 100 million obese citizens. This radical change in our collective condition took place in less than one generation. Our national condition is impacting military readiness, military recruiting, first-responder readiness, and first-responder recruiting. Further, the impacts of obesity have an annual cost that is estimated to be nearly half a trillion dollars. In our mission to meet both acute and chronic homeland security needs, it is crystal clear that the human and economic burdens of obesity are substantial.

Significant information used as guides for fighting obesity has been based on suspect science and supposition. Sugar and refined carbohydrate consumption has increased exponentially over the last 30 years—as has the incidence of Type 2 diabetes and obesity. In the late 1970s, a series of disparate actions and policies converged with a nutritional needs conference led by Senator George McGovern that forever changed the type of food we eat, how it is produced, and the recommended dietary requirements. This in turn demonized dietary fat and shaped a diet that was rich in carbohydrates. The food industry, with an initial fiduciary responsibility to maximize profits for shareholders, set forth to utilize industry and a glut of recently commoditized corn, wheat, soybean, and technology to revolutionize food. Coupled with a reductionist point of view, food was disaggregated into its constituent parts, and then reassembled to appeal to certain physiological functions of the body.

This reassembled food product, rich in refined carbohydrates and devoid of its original organic nutrients, is the fuel that drove the obesity epidemic. This development was further exacerbated by multiple industries that emerged to fight the obesity epidemic. The combination of erroneous advice and information, policy changes, adaptations, and an aggressive, competitive business climate converged. This convergence is the fuel and mechanics of the obesity crisis. These industries and their interests then set forth to blame the very people they were targeting. Claiming the obesity epidemic was merely an energy

balance and exercise issue was at best disingenuous and at worst a crippling formula that has in very short order rendered one-third of the population obese and another one-third of the population overweight.

This energy balance hypothesis has rendered nearly 75% of 18- to 24-year-old American men and women unfit to serve their military. It has also rendered 75% of first responders unfit to serve as well, and has severely impacted the available candidates for future service. Our idea of food and calorie consumption is flawed, and it is killing us and diminishing our capability, robustness, and resilience. Our caloric intake is not much different than France, Austria, or South Korea, and yet, the United States has as much as ten times the obesity as the aforementioned countries. The kind of calories is more important than the amount, or so it appears.

If we are to rectify this situation, one that is reversible, perhaps it is time to investigate, with as little bias and economic interest, the causes and effects of obesity. Our Nation's safety, security, and capability depend on it.

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I. RESEARCHING AND DEFINING WHAT OBESITY IS AND ITS IMPACTS ON A NATION

A. PROBLEM STATEMENT

This thesis is an attempt to demonstrate that obesity, its causes, its effects, and its impacts are undermining homeland and national security because it directly impacts over 100,000,000 Americans.¹ If 35.7% of Americans are obese, and there are roughly 317 million people,² the simple math indicates over one-third are obese. Hence, in excess of 100 million Americans are obese. With this many Americans obese, and another one-third considered overweight and moving toward obesity, it raises a question as to what impact this is having on the population in terms of health, wellness, quality of life, and ability to withstand the rigors and expectations of defending and serving a nation.

This thesis will examine those impacts. Examination of what obesity is doing and does to a population, its calculable and incalculable costs, and its impact on resilience and readiness is the target of this research. The disposition of this research strives to examine and put forth the possibility that our methodology and belief system as to how we have become obese and how to prevent it is incorrect. In that dogmatic assumption, we have been become the most obese nation on earth.

It is the contention of this author and this paper to propose that the policies and innovations within the agricultural industry, policies to exploit that innovation, and a series of unintended consequences have led to a significant national security, and homeland defense and security problem of obesity in the United States. The purpose of this paper and research is not to cure or discover a remedy for the obesity epidemic.

And there may be no simple answer. Politically the “left” may blame the food system while those with “right” leanings may blame it on lack of self-control. Exercise enthusiasts may blame it on lack of motivation, and others will say the obesity epidemic

¹ Cynthia L. Ogden, PhD, Margaret D. Carroll, MSPH, Brian K. Kit, MD., MPH, and Katherine M. Flegal, PhD, “NCHS Data Brief :Prevalence of Obesity in the United States, 2009–2010.” Center for Disease Control. 2012. <http://www.cdc.gov/nchs/data/databriefs/db82.pdf>.

² “Population Clock,” Accessed September 02, 2013. <http://www.census.gov/popclock/>.

is all a means in which researchers overhype a condition that is not that significant to gain grant dollars. It is also not the intention of this thesis to demonize the food industry. The food industry has a fiduciary responsibility to develop opportunities that return on their shareholders investments. They also employ tens of thousands of Americans, comply with laws and regulations, and help power this Nations' economy. That said, practices of the industry are examined and presented.

Whatever one's predilections, recruiters for the armed forces are finding it more and more difficult to find young men and women who are able to meet the weight requirements. It is in this compendium of reasons that our Nation—and its security—will become weakened and compromised.

Thus, an examination of a series of policy decisions, business decisions, and adherence to a belief system that may not be accurate in terms of the cause of obesity will be undertaken. And, in the pursuit of health and readiness and the ubiquitous prophylaxis for obesity, (that being a low-fat, high-carbohydrate diet accompanied by a moderately rigorous exercise plan as the only mechanism for dealing with the crisis) may have actually exacerbated the situation, and in that light, created a series of unintended consequences. As late as 1977, those unintended consequences converged to take a nation that had a low and constant rate of obesity climb exponentially within 30-plus years.

Obesity is a homeland security issue: not only because it is rendering a large part of the population unable to serve in the military, and thus impacts military readiness, but also because it affects recruitment and retention of law enforcement officers, fire fighters, and medical personnel. Its direct and indirect economic impact is nearly half a trillion dollars annually, leaching scarce resources and redirecting money that could otherwise be invested in infrastructure projects, education, defense, or any number of other worthy investments., In remarks in March 2013, Newark, New Jersey Mayor Cory Booker said he thought obesity was the leading crisis in America: "Talk in the nation recently has been gun violence," he said to the hundreds gathered. "But what is killing folks in America, one of the leading causes of death, is obesity-related diseases. And not only is

that killing us; we are dying as a society.”³ America’s obesity epidemic will dwarf the threat of terrorism, if the nation does not reduce the number of people who are severely overweight according to a former Surgeon General.⁴

Obesity, its effects, impacts, and causes are a major disruption to the democratic process and inhibit citizen participation in that process. Obesity erodes confidence in and competence of both leaders and citizens insofar as politics and corporate interests, rather than citizen wellness as policy drivers. Obesity compromises our trust in one another and our institutions because it appears that the medical industry, political mechanisms, and institutions work simply to maintain the inertia of the dogma and not find a resolution. The politics and economics of obesity are strikingly similar to those of the tobacco industry: Their financial interest in the widespread use of (and addiction to) toxic substances; their willingness to invest massive sums of money in the political protection of those interests, and their blame shifting to the “free consumer” who choose “rationally” to use those products.

Obesity directly affects the physiology, psychology, kinesiology, anatomy, endocrinology, and many other systems in the body. We are a less safe, less capable, and a less robust nation because our fitness and wellness has been significantly compromised. We will find ourselves in a vulnerable position with a high risk of security exposure because our health is declining, our costs are skyrocketing, our pool of talent is contracting, and our entire response and military force projection is on the verge of permanent compromise.

A study conducted by Dr. Ryan Masters of Columbia University found that over a 20-year period, approximately 18% of deaths in the United States among people age 40 to 85 were linked to being overweight and obese. This figure is more than three times

³ Cory Booker, “Obesity is the Leading Crisis in America.” Accessed July 30, 2013, <http://www.bookerrising.net/2013/02/cory-booker-obesity-is-leading-crisis.html>,

⁴ Surgeon General: Obesity Could Dwarf Terrorism Threat | Fox News,” Fox News. March 02, 2006. Accessed August 22, 2013. <http://www.foxnews.com/story/0,2933,186621,00.html>.

higher than the projected five percent.⁵ Masters stated: “We expect that obesity will be responsible for an increasing share of deaths in the United States and perhaps even lead to declines in U.S. life expectancy.” This should demonstrate clearly that we have vastly underestimated the impact on our citizenry, readiness, and robustness as a nation.

In its current construct, the military or the Department of Defense is populated by volunteers. This has been the case since 1974. Less than 1% of the citizenry of the United States serves in this voluntary capacity and out of this small segment of the population, the overwhelming majority of eligible citizens are between the ages of 18 and 24, a demographic that is shrinking due to diminished reproduction and also a demographic that is growing exponentially obese.

Therefore, fewer and fewer “recruitable” citizens from the target age demographic are capable of meeting the body composition standards for any of the services. This same pool for first responders is also corrupted by this phenomenon. And, we continue to hemorrhage hundreds of billions of dollars annually on a phenomenon that was and still is largely preventable.

What compounds this readiness statement are the effects of the standard American diet of excessive carbohydrates, excessive processed foodstuffs, food additives, and bad advice that have direct impact on a healthy modality of a vigorous life. Obesity is not a result of too little exercise and excessive calorie consumption—ample scientific evidence suggests the obesity epidemic is neither an exclusively dietary fat-intake issue. Rather, it is our over-consumption of specifically refined sugar and carbohydrates that has caused in one generation obesity and Type 2 diabetes to climb to unprecedented levels. That over-consumption of a highly addictive substance is in turn driven by the over-production of corn.

Excess body fat has a significant deleterious effect on health, performance, and body composition. Being over-fat has orthopedic consequences. Joint denigration, knees

⁵ Ryan K. Masters, Daniel A. Powers, and Bruce . G. Link, “Obesity and U.S. Mortality Risk Over the Adult Life Course.” National Center for Biotechnology Information. February 3, 2013. Accessed August 16, 2013. doi:doi:10.1093/aje/kws325.

and ankles specifically, shoulders, hips and pelvis, and lumbar degenerative damage are all compounded effects of physical activity with additional fat on the body. There are also additional issues with managing core temperature with the additional body fat. Better known as heat illness, the ability of the body to manage heat, metabolic processes, and recovery are negatively affected by excess fat. It is well known that obesity dramatically increases the prevalence of cardiovascular, endocrine, respiratory, and oncological disease.

This is simply one piece of evidence that illustrates the case for obesity as a homeland and national security issue. The impacts of obesity are a resilience issue, a physical performance issue, a medical issue, a cognitive issue, a military readiness issue, an economic issue, and therefore, a Homeland Security issue.

B. RESEARCH QUESTIONS

What are the implications of the obesity epidemic for homeland security? Can the obesity epidemic in the United States be traced to specific policy decisions or legislation? What policy remedies could be developed to reverse this trend or mitigate its impact on homeland security?

C. LITERATURE REVIEW

The purpose of this literature review is to determine the scope and magnitude of the studies, literature, findings, and professional opinions with regard to causes, reasons, science, and reduction of obesity and its effects. PubMed comprises over 22 million citations for biomedical literature from MEDLINE, life science journals, and online books. PubMed citations and abstracts include the fields of biomedicine and health, covering portions of the life sciences, behavioral sciences, chemical sciences, and bioengineering. A search of obesity nets over 184,000 scientific articles. A Google Scholar search of obesity produced almost 2.9 million searchable “hits.” Even a simple obesity query on Amazon.com produced 18,000 plus unique titles.

This literature review was initiated to explore two distinct issues as they relate to homeland security. The first issue is researching and discussing the causes and

subsequent effects of obesity. There is no shortness of literature, opinions, studies, books, and points of view on the subject matter. It is staggering. In fact, there is so much contradictory information available, there appears to be a subterfuge quality to dispositions of points of view. Obesity is a growing problem, and we are not completely sure how or why. It is the number one health risk in the United States.⁶

The second issue perhaps a bit more opaque; Obesity and its relationship to homeland security. It is my position that homeland security definitions get trapped in a metaphorical monoculture and diversity introduced to the homeland security theme or broadening of the definition are often dismissed. That said, I believe there is a case to be made that the current obesity dialogue is impactful on homeland security and particularly the readiness of potential service members. The growing impact on medical costs, economic burdens, and reducing an already tiny percentage of the population that serves in the military will have dramatic impact on our nation's ability to recruit, project force, defend, and respond to calamities and threats.

What do we currently know, or what is it we think we know? The research regarding obesity is vast, contradictory, controversial, elusive, and expensive. With thousands of books written annually, multiple documentaries released,⁷ and upwards of \$40 billion annually spent on the weight loss industry, that industry is both an obsession and big business.⁸

Some authors postulate that our obesity problem is one with a negative impact globally and may begin to interact with food scarcity and security.⁹ Our current rates of obesity, particularly in the United States, have created an increased energy and food

⁶ Cynthia L. Ogden, PhD, Margaret D. Carroll, MSPH, Brian K. Kit, MD, MPH, and Katherine M. Flegal, PhD "NCHS Data Brief ; Prevalence of Obesity in the United States, 2009–2010." Center for Disease Control. 2012. <http://www.cdc.gov/nchs/data/databriefs/db82.pdf>.

⁷ Hungry for Change, <http://www.hungryforchange.tv/>.

⁸ Rebecca Risner, and Derek Thompson, "*The Diet Industry: A Big Fat Lie*." Bloomberg Business Week. No., 10 January 2008.

⁹ Sarah Catherine Walpole, David Prieto-Merino, Phil Edwards, John Cleland, Gretchen Stevens, and Ian Roberts, "The Weight of Nations: An Estimation of Adult Human Biomass." National Center for Biotechnology Information. June 18, 2012. Accessed September 11, 2013. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3408371/>.

demand of at least another billion people.¹⁰ That is one point of view—it is the fault of people; they eat too much. Other research and experts point out that more studies are necessary and the impacts of obesity are far reaching and expensive.¹¹ Still more studies and institutions put the crisis as a mere energy balance problem and lack of exercise.¹² The obsession with calories and being “thin” has also had its effect on behavior and demonstrates a lack of knowledge and an obsession for the aesthetic as opposed to health.¹³

The United States Department of Agriculture (USDA) recommends a diet that is high in carbohydrates (approximately 65%) and low in consumption of fat.¹⁴ So too does the American Heart Association. (AHA). In contrast, Gary Taubes, an American science writer and author of two very well-documented books, *Good Calories/Bad Calories* and *Why We are Fat* vigorously contradicts the previously mentioned idea and makes a case that our following recommended dietary guidelines focusing on carbohydrates as a possible culprit.¹⁵ Weight gain, therefore, is not a thermodynamic issue or mere calories in and out (energy balance) issue according to Taubes, but an endocrine one and our abundant carbohydrate consumption. This hypothesis is the antithesis of the United States Department of Agriculture (USDA) dietary guidelines.¹⁶

Journalist and author Michael Pollan has still a different idea as to why we have seen an exponential increase in obesity. His point of view is laid out in his books, the *Omnivores Dilemma*, *In Defense of Food*, and *Botany of Desire*. Pollen lays out his case

¹⁰ Ibid.

¹¹ Susan Lang, “Study: Obesity Accounts for Almost 17 Percent of Medical Costs -- Twice What Was Previously Thought | Cornell Chronicle.” Study: Obesity Accounts for Almost 17 Percent of Medical Costs -- Twice What Was Previously Thought | Cornell Chronicle. January 20, 2010. Accessed September 11, 2013. <http://www.news.cornell.edu/stories/Oct10/ObesityCosts.html>.

¹² “What Causes Overweight and Obesity?” - NHLBI, NIH. July 13, 2012. Accessed September 11, 2013. <http://www.nhlbi.nih.gov/health/health-topics/topics/obe/causes.html>.

¹³ Dean Ornish, “Eating for Health, Not Weight.” NYTimes. September 22, 2012. Accessed September 11, 2013. http://www.nytimes.com/2012/09/23/opinion/sunday/the-optimal-diet.html?_r=1&.

¹⁴ “Dietary Guidelines for Americans, 2010.” USDA. 2010. <http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/ExecSumm.pdf>.

¹⁵ Phone interview, April 10, 2012 between Dan O’Connor and Gary Taubes.

¹⁶ “Dietary Guidelines for Americans, 2010.” USDA. 2010. <http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/ExecSumm.pdf>.

that petroleum in the form of hydrocarbon fertilizer and pesticides, corn derivatives, food monocultures, and over processing of food stuffs has created both an endocrine and a sustainability issue. He further postulates that the current Agriculture Reform, Food, and Jobs Act of 2013 (S. 954; 113th Congress) or better known as the Farm Bill is a primary driver of our food, its production and the food industry.¹⁷ Michael Galasso, a Canadian fitness, nutrition, and conditioning professional from Waterloo, Canada in a phone interview stated simply “we are grossly overfed and grossly undernourished.”¹⁸

In *Food Fight* by Kelly D. Brownell, PhD,¹⁹ the Director of the Rudd Center for Food Policy and Obesity at Yale postulates that obesity is a cabal of sorts and dubs it a toxic environment; food industry using supersizing, saturation advertising from infancy on, aggressive lobbying and marketing, and capitalism that has made us fat, on purpose.

There are many authors and books that will be referred to and cited in this thesis. The exercise is to examine and discuss a variety of ideas and hypotheses in order to determine if there is a theme, trend or causality.

The Center of Disease Control (CDC) and National Institute of Health (NIH) fund, publish, and suggest in hundreds of studies to simply eat less food and do more exercise.²⁰ And, there are studies with documented success that advocate veganism, vegetarianism, whole foods, and even fast food as a methodology to lose weight and reverse obesity. Each point of view has a voice in the obesity epidemic. Are they all wrong, all partially correct or is something else taking place unbeknownst to us?

Another vector of information that provides a better picture is data from a variety of government organizations. Production data, health data, obesity data, consumption, and a variety of other metrics are available to analyze and make determinations. In particular, in terms of literature and study is the economic impact of obesity on health

¹⁷ Michael Pollan, “Michael Pollan on Stop-Animation Video.” February 23, 2012. Accessed September 12, 2013. <http://michaelpollan.com/videos/michael-pollan-on-stop-animation-video/>.

¹⁸ Phone interview, April 28, 2012 between Dan O’Connor and Michael Galasso.

¹⁹ “Kelly D. Brownell.” Wikipedia. July 17, 2013. Accessed September 02, 2013. http://en.wikipedia.org/wiki/Kelly_D._Brownell.

²⁰ Losing Weight,” Centers for Disease Control and Prevention. August 17, 2011. Accessed September 02, 2013. http://www.cdc.gov/healthyweight/losing_weight/index.html.

costs. Currently, according to data and literature analysis, the United States spends the least amount of income on food and the most amount income on health care.²¹²² And the money we do spend on food is overwhelmingly proportioned towards refined, processed food like product.²³ Currently, the NIH is recruiting test subjects for a variety of studies on obesity.²⁴ Additional studies point to the environment as a precursor to the rise of obesity. Recent reports link exposure to environmental endocrine disrupting chemicals during development with adverse health consequences, including obesity and diabetes.²⁵ Still more studies point to the food industry itself. These data fields when applied and used to augment other trend analysis create a clearer, more precise picture of the causes of obesity.

Approximately 75% of the \$2.8 trillion in annual health care costs in the United States is from chronic diseases that can often be reversed or prevented altogether by a healthy lifestyle.²⁶²⁷ If current trending holds true, obesity and its impacts medically are expected to reach in the hundreds of billions of dollars and that health care will cost \$4.6 trillion dollars annually and consume 19.8% of the Gross Domestic Product (GDP)

²¹ “Countries That Spend the Most on Health Care,” 247wallst.com. March 29, 2012. Accessed September 12, 2013. <http://247wallst.com/2012/03/29/countries-that-spend-the-most-on-health-care/3/>.

²² Alyssa Battistoni, “America Spends Less on Food Than Any Other Country.” Mother Jones. February 1, 2012. Accessed September 02, 2013. <http://www.motherjones.com/blue-marble/2012/01/america-food-spending-le>.

²³ J. D. Heyes, “Meats, Veggies, Dairy Replaced by Processed Foods.” Modern-day America Spends Most of Its Grocery Money on Processed Foods. June 17, 2012. Accessed September 02, 2013. http://m.naturalnews.com/news/036198_groceries_Americans_processed_foods.html.

²⁴ “Search Results for Clinical Trials on Obesity Related Issues,” Search Of: NIH. Accessed September 12, 2013. <http://clinicaltrials.gov/ct2/results?fund=0>.

²⁵ Retha R. Newbold. “Impact of Environmental Endocrine Disrupting Chemicals on the Development of Obesity.” *Hormones* 9, no. 3 (2010): 206–17.

²⁶ Perviz Asaria, Dan Chisholm, Colin Mathers, Majid Ezzati, and Robert Beaglehole. “Chronic Disease Prevention: Health Effects and Financial Costs.” *Lancet* 370 (December 7, 2007): 2044–053. doi:10.1016/S0140–6736(07)61698–5.”The WHO Comparative Risk Assessment project estimated the number of deaths from chronic diseases, which could potentially be averted if the distributions of major risk factors were reduced”

²⁷ Ezzati M, Lopez AD, Rodgers A, Murray CJL, Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors. Geneva, Switzerland: World Health Organization, 2004

by 2020.²⁸ What is significant about this cost is how accelerated and growing expenditure will affect the national economic picture in comparison to the interdependence of projected unfunded deficiencies, national resilience, homeland security, and military readiness. I believe one could make the case that current behaviors, whether economic, energy expenditure, political, or a host of others when grossly out of balance synergize and create unintended consequences.

The obesity paradigm is also costly in other ways. With regard to obesity, I believe there is a relativism exercised as it relates to homeland security. To me and others I have spoken with, homeland security could be defined as meeting the minimum needs of life. Abraham Maslow a psychologist in his 1943 paper “A Theory of Human Motivation” proposed a hierarchy of needs and at the most basic, physiological level, security is primordial and a basic survival instinct. I would say Maslow is accurate in defining a homeland security point of view. Are we jeopardizing that instinct with our behaviors?

Moving further from what one might deem the terrorism/all hazards model, I also find great merit with definitions in the article “Changing Homeland Security: What is Homeland Security?” written by Dr. Christopher Bellavita.²⁹

In examining the authors points of view, one clearly resonated with me; “Homeland security is about meta hazards” Bellavita states; “Ecosystems have outliers, entities struggling to find a niche and survive. Tailoring the definition of homeland security for an individual jurisdiction is one end of a continuum. At the other end is a definition that focuses on hazards that affect everyone in the nation.”³⁰ He further states that “A definition from this perspective says homeland security could be about practically anything. One might respond, “If homeland security is about everything, it is about

²⁸ Sarbjit Nahal, Valery Lucas-Leclin, and John King, “Globesity – the Global Fight against Obesity.” Food Politics. June 21, 2012. http://www.foodpolitics.com/wp-content/uploads/Globesity-Report_12.pdf.

²⁹ Christopher Bellavita, Homeland Security Affairs, Vol I, Issue 1, Article 1, Summer 2005, <http://www.hsaj.org/hsa>.

³⁰ Ibid.

nothing.” The nation has finite resources that can effectively be used only to address the most probable and most immediate threats.

By examining a diverse amount of points of view, production data, trends, and analysis over time, textbooks, and government studies and statistics, one can make some observations about the causes and impacts of obesity.

1. What is Unknown?

Is obesity actually having a negative impact on obesity? Currently 1/3 of one percent of the Nation’s population serves in the armed forces of the United States.³¹ With approximately 1.4 million active duty service members representing a country of some 317 million people the pool of available candidates is ever shrinking. Accordingly, the U.S. Department of Defense reports that 27% of 17- to 24-year-olds in the United States are too fat to serve in the military. In addition, the combination of obesity, education, and drug use renders 75% of potential recruit ineligible to serve in the military.³²

Is obesity as a readiness and homeland security issue being researched? There are several theses that have recently been published from the Army Command and Staff College that scratch the surface but have not grasped the gravity of the situation.³³ There appears to be an opportunity for repositioning the data to make an argument that there is an issue emerging.

The all-volunteer force that feeds the military recruiting effort may become compromised as well and its success is incumbent on having a viable, deep, and plentiful body of recruits to draw from.³⁴ Several studies by the RAND institute on the transition from conscription to the all-volunteer force gives excellent background on the process

³¹ “United States Armed Forces,” Wikipedia. December 09, 2013. Accessed September 12, 2013. http://en.wikipedia.org/wiki/United_States_Armed_Forces.

³² Rick Montgomery, “75% of Young Americans Called Unfit for Military.” The Children’s Institute. November 14, 2009. Accessed September 12, 2013. <http://www.childinst.org/news/102-75-of-young-americans-called-unfit-for-military>.

³³ Kathleen Davis, “Obesity: A National Security Concern.” Thesis, United States Army War College, Carlisle, Pa, 2011.

³⁴ Lieutenant Colonel James D. Brown, A National Security Issue: Challenges to the All-Volunteer Force. Thesis, United States Army War College, Carlisle, Pa, 2012.

and transitions that were necessary for the process to take place and hold for nearly four decades.³⁵³⁶ In an article for CNN, David Frum wrote, “Obesity and overweight devour 10% of our national health spending.³⁷ Obese and overweight people earn less and are also less likely to be hired and promoted. And since 1990, obesity and overweight issues have emerged as crucial problems for military planners—so much so that a group of retired officers has branded America’s high-calorie school lunch programs as a threat to national security.”³⁸ In addition, data from the Centers for Disease Control and Prevention (CDC) show an alarming increase in obesity rates among young adults across the country.

If left unchecked, obesity and its costs will potentially bankrupt this nation.³⁹ In 2008, more than 4,500 service members were discharged for failure to maintain the appropriate weight designated by their service.⁴⁰ What is also unknown is what if the methodology for weight control and reduction is incorrect? What if the information, formulas, methodologies, and anecdotes used for corrective action are incorrect, erroneous, are based on faulty science? What is also an unknown is the availability of proven methods to retard and subsequently reverse the alarming trends in obesity we have seen in the last twenty years. The adoption of the all-volunteer force operated on the premise that the nation would be able to sustain itself in a variety of situations and circumstances. Based on all the available research and a synthesis of different data fields a contradictory conclusion can be drawn.

³⁵ Bernard D. Rostker, “The Evolution of the All-Volunteer Force.” RAND Corporation Provides Objective Research Services and Public Policy Analysis. 2006. Accessed September 02, 2013. http://www.rand.org/pubs/research_briefs/RB9195/index1.html.

³⁶ Ibid.

³⁷ David Frum, “Why Obesity Is a National Security Threat.” CNN.com. December 6, 2010. Accessed September 12, 2013. http://articles.cnn.com/2010-12-06/opinion/frum.obesity.military_1_military-personnel-physical-education-military-service?_s=PM:OPINION.

³⁸ David Frum, “Why Obesity Is a National Security Threat.” CNN.com. December 6, 2010. Accessed September 12, 2013. http://articles.cnn.com/2010-12-06/opinion/frum.obesity.military_1_military-personnel-physical-education-military-service?_s=PM:OPINION.

³⁹ “Obesity Epidemic Threatens to Bankrupt the Nation.” Healthcare Finance News. Accessed September 12, 2013. <http://www.healthcarefinancenews.com/news/obesity-epidemic-could-bankrupt-nation>.

⁴⁰ Navy Program Puts Sailors in ‘Ship Shape, DC Military. July 15, 2010. Accessed September 12, 2013. http://ww2.dcmilitary.com/stories/071510/journal_28248.shtml.

Many of the studies also have a bias or the appearance of a bias. Whether it is a funding issue, scholarship issue, or simply an academic point of view, there is a necessity to exercise a meta-survey of the funding streams and support structure for many of the studies. While the data could be used to find a solution, the immediacy of a solution in the future is unlikely because of the interdependencies and politics involved, as they relate to obesity and its causes.

However, examining the trending data, illustrative graphs, and causation that obesity and all its cascading effects and order of effects is a significant issue that needs to be addressed. Perhaps the data is correct, and it is simply being misinterpreted. There is an urgent need to do this cross pollination of readiness and obesity. These data points and the conversation of obesity, health care, and readiness are interdependent and are a strategic national security issue and a situation or problem we are completely capable of slowing or reversing with some difficult decisions and decisive leadership.

D. CONCLUSION

This literature review requires a disciplined rigor, due to the volume and breadth of material. It could become overwhelming. A disciplined approach is necessary to avoid the research process from becoming a large data chase. There is much written and with every periodical, report, study, and book read the necessity to pick a theme or point of view becomes more important.

Hundreds of billions of dollars is devoted to examination and remedying the obesity crisis, the medical costs, and the unintended consequences. With the addition and relationship with military readiness, there is a hope that one can articulate an argument that obesity is impacting homeland security. The exponential obesity epidemic is impacting the United States, and its emergence is tied to policy decisions and legislation. And only policy remedies and information can be developed and shared to stop and reverse the impacts of obesity on homeland security.

1. Method and Research Design

This research is a policy analysis and development project. The subject of this analysis is the collection of policies and laws that have direct consequences or implications for the obesity epidemic in the U.S. over the last generation. Specifically, there appear to be four relevant policies or laws: (1) The belief and subsequent publishing of medical studies that alleged dietary fat was deleterious to health, (2) the Nixon administration policies on agriculture and its funding, (3) the McGovern Commission and its recommendations, and (4) the industrial food system emerging as surplus agricultural product was commoditized and disaggregated into foodstuffs.

The consequences of these policies and supplementing them with data from the NIH and CDC, the industrial, chemical and agricultural industries, advocacy groups, lobbying firms, and political action committees will demonstrate a causal relationship and factors that have resulted in U.S. obesity levels increasing exponentially over the last 30 years.

An analysis of the impact of obesity will then be made on national/homeland security, specifically as it pertains to military and First-responder readiness, recruitment conditions, and the costs of medical intervention as they relate to economic resilience.

Finally, assuming our hypothesis that obesity has not risen and developed as a national epidemic organically or unintentionally—but rather as a direct result of deliberate policy action—can be confirmed through this analysis. The output of this research is expected to be a set of policy recommendations that would contribute to a remedy or reversal of this condition, thus improving homeland and national security.

As the thesis unfolds, each chapter will attempt to capture the implications of the obesity epidemic for homeland security, the policies and innovations that may have led the epidemic in the United States, and if there are any policy remedies that can be developed to reverse this trend or mitigate its impact on homeland security? With that, the next chapter will examine the possibility of obesity and its effects being a homeland security issue.

II. HOW IS OBESITY A HOMELAND SECURITY ISSUE?

Is obesity a homeland security issue? Does one have to know the causes and effects of obesity to raise that question? Do we need a declarative definition of homeland security in order to make the assertion that obesity and homeland security have a relationship? Perhaps there is a relationship.

Homeland security is more than preventing terrorism. One's understanding of homeland security might be that anything that disrupts or jeopardizes the homeostasis of the populace, disrupts the mean expectation of safety, security, and wellness, and has negative outcomes, could be construed as a homeland security issue. One might also postulate that any trend that disrupts the stability of the country is a homeland security issue. Dr. Christopher Bellavita calls these instances or disruptions Meta hazards.⁴¹ Within that framework one could further postulate there are two states; an acute state and a chronic state. The acute state of homeland security is the disruption(s), attack(s), and interruption(s) of what one may consider "normal." These novel incidents are what some believe to be a primary homeland security function. Then there is the other state, the chronic state. The chronic state of homeland security is that place where long-term consequences mature into potential crises if left unattended, unidentified, or unexamined.

Using that process and definition, one could then suggest that obesity, its effects, costs, and consequences are a national security and homeland security issue. As we learned in the previous chapter, more than one hundred million Americans are obese. This condition, therefore, affects both economics and readiness. Economics are also a homeland security issue. Health care spending due to obesity is estimated to be as high as \$210 billion annually, or 21% of total national health care spending.⁴² Obesity and its catalyst in a host of chronic diseases now exceed smoking as it relates to medical costs.⁴³

⁴¹ Christopher Bellavita, "Changing Homeland Security: What is Homeland Security?" *Homeland Security Affairs* 4, issue 2 (June 2008).

⁴² Sharon Begley. "As America's Waistline Expands, Costs Soar." *Reuters*. April 30, 2012. Accessed July 30, 2013. <http://www.reuters.com/article/2012/04/30/us-obesity-idUSBRE83T0C820120430>.

⁴³ *Ibid*.

When also accounting for the nonmedical costs of obesity, the overall annual cost is estimated to be \$450 billion.⁴⁴ Obesity accounts for 8.5% of Medicare expenditure, 11.8% of Medicaid expenditure, and 12.9% of private insurance expenditure.⁴⁵ Four hundred and fifty billion dollars annually could revolutionize our national infrastructure, fund any number of programs exclusively, and actually fund better food, health, and education systems. If the nation returned to the obesity rates of 30 years ago, it would recoup that one-half trillion dollars annually spent on it. A strong and vibrant democracy must grow and innovate. We are literally throwing money away and diminishing peoples' capabilities because we spend hundreds of billions on something that may be largely preventable.

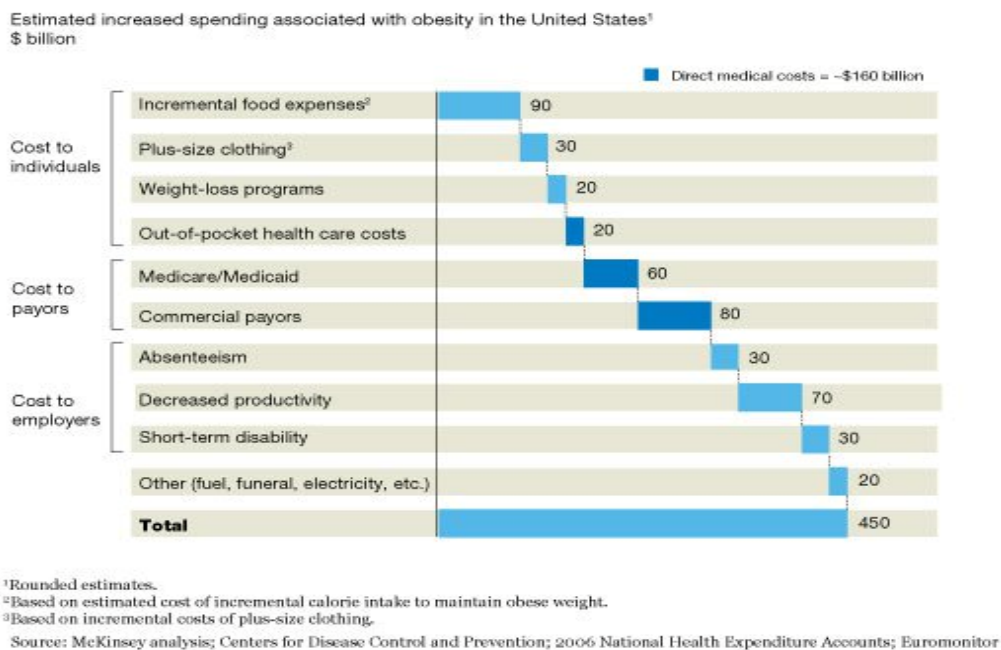


Figure 1. Estimated increased spending associated with obesity in the United States, provided by McKinsey and Associates

⁴⁴ Jeffrey Algazy, MD MPH, Steven Gipstein, MD, Farlad Riahi, MD, and Katherine Tryon, MD., "Why Governments Must Lead the Fight against Obesity." McKinsey Quarterly/McKinsey&Company, October 2010, 1–19.

⁴⁵ Eric A Finkelstein, Justin G Trogon, and Joel W. Cohen "Health Affairs, Annual Medical Spending Attributable To Obesity: Payer-And Service-Specific Estimates. Accessed August 01, 2013. <http://content.healthaffairs.healthbrighter.com/content/28/5/w822.full>.

In a continuing and forecasted restrictive and contracted fiscal environment, escalating costs also constitute a homeland security issue.

There is substantial evidence that obesity is a primary cause of chronic diseases,⁴⁶ and chronic diseases account for 70% of all deaths in the U.S.⁴⁷ Chronic diseases account for \$3.00 of every \$4.00 spent on healthcare, or approximately \$7,900 for every American with a chronic disease.⁴⁸ The combined cost of obesity and chronic disease is \$1.098 trillion dollars, annually.⁴⁹ A preliminary assessment of these statistics reveals the impact of obesity as very expensive and lethal. In a continued restrictive and contracted fiscal environment, it must be at least entertained that economically, the effect of obesity on health care should be considered a homeland security issue. There may be room for debate, discussion, or argument, but the fact remains that obesity and its effects are having and will continue to have a profound impact on the United States.

Military readiness is a homeland security and national security issue. Obesity and its medical impacts are negatively affecting military recruitment, military retention, physical performance, cognitive performance, and aptitude. Obesity is impacting the military readiness of this country. Currently, nearly two-thirds of active duty service members are classified as overweight or obese.⁵⁰ One study states that 75% of all 17- to 24-year-olds are not fit to perform.⁵¹ And currently, the Pentagon spends in excess of one

⁴⁶ Low physical activity and obesity: causes of chronic disease or simply predictors? *Med Sci Sports Exerc.* 2007 Aug; 39(8):1233–40.

⁴⁷ Centers for Disease Control and Prevention. July 24, 2013. Accessed July 30, 2013. <http://www.cdc.gov/chronicdisease/index.htm>.

⁴⁸ Centers for Disease Control and Prevention, August 13, 2012. Accessed July 30, 2013. <http://www.cdc.gov/chronicdisease/overview/index.htm>.

⁴⁹ Ibid.

⁵⁰ “Overweight in the Military Brief; Health Care Survey of DoD Beneficiaries,” [Www.tricare.mil/survey/hcsurvey/issue-briefs/issuebriefCY05Q1.pdf](http://www.tricare.mil/survey/hcsurvey/issue-briefs/issuebriefCY05Q1.pdf).
<http://www.tricare.mil/survey/hcsurvey/issue-briefs/issuebriefCY05Q1.pdf>.

⁵¹ U.S. Congress, House. Committee on Armed Services. Recruiting, Retention and End Strength Overview Hearing before the Military Personnel Subcommittee of the Committee on Armed Services, House of Representatives, One Hundred Eleventh Congress, First Session, Hearing Held March 3, 2009. 111 Cong., 1st sess. H. Doc. Washington: U.S. G.P.O., 2010. Statement of Dr. Curtis Gilroy Director, Accessions Policy, Office of the Undersecretary of Defense for personnel and readiness, p4

billion dollars annually on medical care relating to weight and obesity.⁵² Being overweight or obese turns out to be the leading medical reason why applicants fail to qualify for military service.⁵³

This has significant impact on the Department of Defense and their ability to effectively draw enough eligible and qualified males and females between the ages of 18–24 for military service in the all-volunteer force. Increasing rates of obesity in the United States have decreased and continue to decrease the share of enlistment age population that is eligible for military service.⁵⁴ Obesity and its impact is the key recruiting concern and primary reason for volunteer service rejection.⁵⁵ According to a 2009 RAND study, upwards of 35% of young men and 60% of young women would fail the weight standards of at least one military service.⁵⁶ The rate of obesity in adults has doubled in the last 20 years. It has almost tripled in children ages 2–11. It has more than tripled in children ages 12–19.⁵⁷

National trends as of 2009 show an increase in obesity across the entire spectrum of the population

- From 20.3% to 31.9% among non-Hispanic white men
- From 21.1% to 37.3% among non-Hispanic black men
- From 23.9% to 35.9% among Mexican-American men

Among women, non-Hispanic black women (49.6%) were significantly more likely to be obese than non-Hispanic white women (33.0%). Similarly, Mexican-

⁵² “Too Fat to Serve: Military Wages War on Obesity,” CBS News. March 08, 2012. http://www.cbsnews.com/8301-505263_162-57393115/too-fat-to-serve-military-wages-war-on-obesity/. Accessed July 30, 2013.

⁵³ Ibid.

⁵⁴ Requirements and the Demographic Profile of the Eligible Population. www.diversity.defense.gov. November 2009. <http://diversity.defense.gov/Resources>. Increasing rates of obesity in the United States have decreased the share of the enlistment age population that is eligible for military service.

⁵⁵ Ibid.

⁵⁶ Beth J. Asch, Christopher Buck, Jacob Alex Klerman, Meredith Kleykamp, and David S. Laughran, (2009). *Military enlistment of Hispanic Youth: Obstacles and opportunities*. Santa Monica, CA: RAND Corporation.

⁵⁷ “Facts,” Centers for Disease Control and Prevention. April 27, 2012. Accessed July 30, 2013. <http://www.cdc.gov/obesity/data/facts.html>.

American women (45.1%) were more likely to be obese than non-Hispanic white women (33.0%). Similar disparities existed in 1988–1994 (22.9% of non-Hispanic white women, 38.3% of non-Hispanic black women, and 35.3% of Mexican-American women were obese).

Between 1988–1994 and 2007–2008, the prevalence of obesity among women increased.

- From 22.9% to 33.0% among non-Hispanic white women
- From 38.2% to 49.6% among non-Hispanic black women
- From 35.3% to 45.1% among Mexican-American women⁵⁸

The percentage of adults 20 years and over who are overweight, including obesity and morbidly obese is between 69.2% and 73.6%, depending on the source.^{59,60} These trends do not appear to be abating in any way. This data suggests that diversity, a well-represented desire and force multiplier in an all-volunteer force and a robust force, are becoming increasingly difficult to maintain.

Obesity is in fact a national and homeland security issue. If people are this Nations' most important asset, and there is something that is prohibiting them from either performing to a standard or worse—not capable of meeting the standard—that something would be detrimental to the nation's defense and security. That something is the impact of obesity.

With a nation of 330 plus million people, the numbers and the impact of obesity on military readiness is very significant.

⁵⁸ Centers for Disease Control and Prevention, June 06, 2011. Accessed July 30, 2013. http://www.cdc.gov/nchs/data/hestat/obesity_adult_07_08/obesity_adult_07_08.htm.

⁵⁹ Requirements and the Demographic Profile of the Eligible Population. www.diversity.defense.gov. November 2009. <http://diversity.defense.gov/Resources>. Increasing rates of obesity in the United States have decreased the share of the enlistment age population that is eligible for military service.

⁶⁰ Centers for Disease Control and Prevention, May 30, 2013. Accessed July 30, 2013. <http://www.cdc.gov/nchs/fastats/overwt.htm>.

Only three tenths of one percent of the population serves on active duty in the all-volunteer forces.⁶¹ Where do the military recruits come from? Of that 1.4 million, roughly 60% to 80% are 18–24, as noted in Table 1.

Table 1. A comparison of age groupings and branch of military service.

Service	18-21	22-30	31-40	41-50	51-59	Average Age
Army	18.3 %	48 %	25.6 %	7.9 %	0.7 %	29
Navy	18.6 %	46 %	26.3 %	8.3 %	0.8 %	29
Marine Corps	36.9 %	46 %	14 %	3.1 %	0.2 %	25
Air Force	14.4 %	46 %	28.3 %	10 %	0.6 %	30
Coast Guard	12.2 %	48 %	27 %	12 %	1 %	30

Approximately one million of the 1.4 million Americans serving in the all-volunteer force are 18–24 years of age. Provided by U.S. Census.

As noted in Table 2, according to the 2010 United States Census, there are 30.6 million 18–24 year-old men and women in the United States.

⁶¹ ACTIVE DUTY MILITARY PERSONNEL STRENGTHS BY REGIONAL AREA AND BY COUNTRY (309A), Siadapp.dmdc.osd.mil. September 30, 2010.
<http://siadapp.dmdc.osd.mil/personnel/MILITARY/history/hst1009.pdf>.

Table 2. Comparison of United States 2000 and 2010 Census Bureau age groupings. Provided by U.S. Census.

Population by Sex and Selected Age Groups: 2000 and 2010

(For information on confidentiality protection, nonsampling error, and definitions, see www.census.gov/prod/cen2010/doc/sf1.pdf)

Sex and selected age groups	2000		2010		Change, 2000 to 2010	
	Number	Percent	Number	Percent	Number	Percent
Total population	281,421,906	100.0	308,745,538	100.0	27,323,632	9.7
SEX						
Male	138,053,563	49.1	151,781,326	49.2	13,727,763	9.9
Female	143,368,343	50.9	156,964,212	50.8	13,595,869	9.5
SELECTED AGE GROUPS						
Under 18 years	72,293,812	25.7	74,181,467	24.0	1,887,655	2.6
Under 5 years	19,175,798	6.8	20,201,362	6.5	1,025,564	5.3
5 to 17 years	53,118,014	18.9	53,980,105	17.5	862,091	1.6
18 to 44 years	112,183,705	39.9	112,806,642	36.5	622,937	0.6
18 to 24 years	27,143,454	9.6	30,672,088	9.9	3,528,634	13.0
25 to 44 years	85,040,251	30.2	82,134,554	26.6	-2,905,697	-3.4
45 to 64 years	61,952,636	22.0	81,489,445	26.4	19,536,809	31.5
65 years and over	34,991,753	12.4	40,267,984	13.0	5,276,231	15.1
16 years and over	217,149,127	77.2	243,275,505	78.8	26,126,378	12.0
18 years and over	209,128,094	74.3	234,564,071	76.0	25,435,977	12.2
21 years and over	196,899,193	70.0	220,958,853	71.6	24,059,660	12.2
62 years and over	41,256,029	14.7	49,972,181	16.2	8,716,152	21.1

Sources: U.S. Census Bureau, *Census 2000 Summary File 1* and *2010 Census Summary File 1*.

Of that 30.6 million, 49% are males and 51% are females. That makes for the argument, approximately 15 million males and 16 million females eligible for recruitment into the all-volunteer force. The all-volunteer force is approximately 85% male and 15% female. Using the previously established framework that 75% are ineligible to volunteer, or not fit for military service, that reduces the available number to 3.75 million males and 4 million females, respectively. Recruitment data suggests that the top and bottom 15% of the population in terms of income are not represented favorably. Also, current enlistment requirements almost universally require a minimum of a high school diploma or General Equivalency Degree (GED).

That reduces the number by approximately one million available candidates. The anecdotal data from interviews with military recruiters suggests that for every 10 Americans that demonstrate interest in military service, only one individual actually will commit to a tour in the military. That reduces the available pool to less than a million men and a million women for recruitment. With an annual turnover rate of 15%, the military must recruit approximately 215 thousand new recruits annually. So from a nation

of 330 million people, the available recruit pool is reduced into the hundreds of thousands.

The margin of error is very, very small for recruitment, selection, and successful matriculation into the all-volunteer armed forces.

Obesity is also having impact on the current active duty service member. The military health insurance system (TRICARE) already pays \$1.1 billion each year for obesity-related medical care, more than the costs linked to alcohol and tobacco use combined, according to a study in the American Journal of Health Promotion. (Those numbers do not include people who are in the Veterans Affairs health care system.) And according to Military Times, in 2012, the Army removed approximately 16 times additional U.S. troops for being overweight than the previous five years.⁶² Military members are getting fat on active duty.

The Armed Forces Health Surveillance Center stated that between 1998 and 2010, the number of active-duty military personnel categorized as overweight or obese more than tripled, with 86,186 troops diagnosed as overweight or obese in 2010.⁶³

⁶² “Army Separating More Troops for Being Overweight | Military.com,” Army Separating More Troops for Being Overweight | Military.com. Accessed July 27, 2013. <http://www.military.com/daily-news/2012/12/11/army-separating-more-troops-for-being-overweight.html>.

⁶³ Diagnoses of Overweight/obesity, Active Component, U.S. Armed Forces, 1998–2010 7, MEDICAL SURVEILLANCE MONTHLY REPORT 18, no. 1 (January 2011): 7–11.

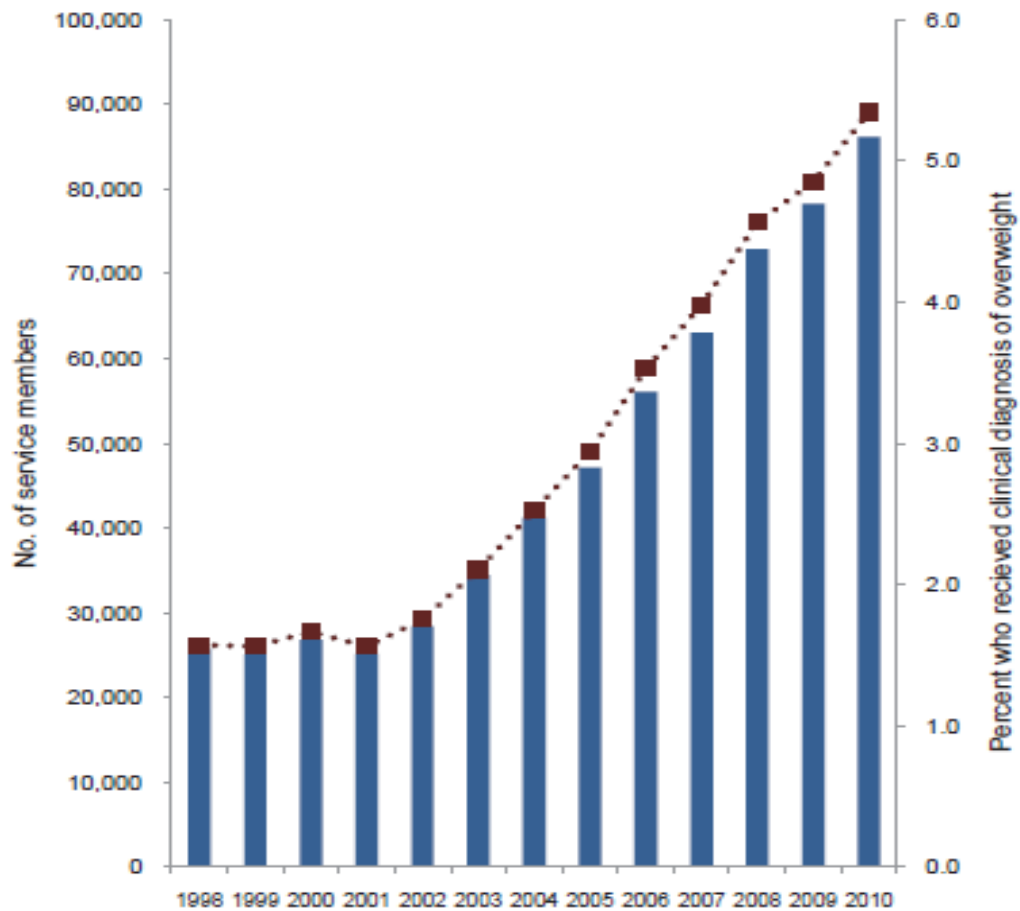
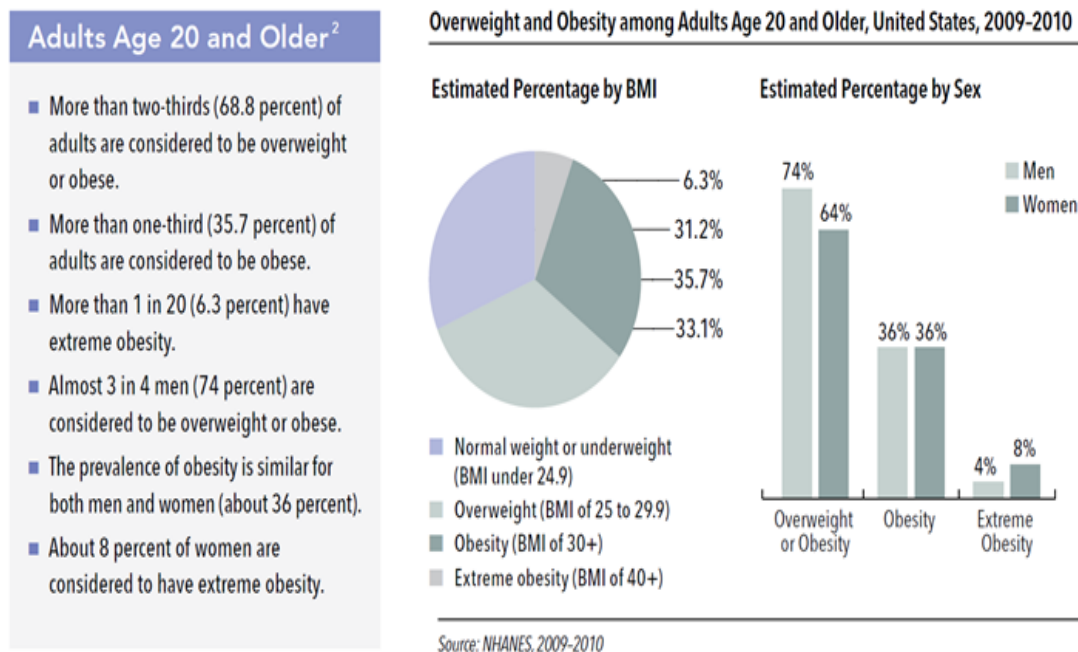


Figure 2. Crude overall number and percentage of service members who received an outpatient diagnosis of overweight/obesity, by calendar year, active component, U.S. Armed Forces, 1998–2010. Provided by The Armed Forces Health Surveillance Center.

That would indicate that military members are gaining weight ON ACTIVE DUTY, since otherwise, they would not have been allowed entrance.

The evaluation of the data in Table 3 reveals that the eligible pool of fit enough, thin enough, and smart enough Americans is very small. Obesity is rendering anywhere from 67% to over 75% of the available Americans unable to serve.

Table 3. Overweight and obesity by percentage of population. Provided by NHANES, 2009–2010.



Obesity was never considered a realistic or significant issue during the transition from the conscription force to a standing all-volunteer professional Army. One could speculate that if current trends continue, the United States will have to consider the efficacy of conscription vice voluntary service to meet the national security needs of a nation.

Obesity is also having a detrimental effect on first responder recruitment as well. Former U.S. Surgeon General Richard H. Carmona stated: “It (obesity) is eroding our society. It will bring a disease burden we can’t afford.”⁶⁴ He further went on to discuss its impact not only on military readiness but first responders as well.⁶⁵ “Unless we do

⁶⁴ HSC NEWS - U.S. Surgeon General Carmona Calls Obesity ‘the Terror Within,’ HSC News - U.S. Surgeon General Carmona Calls Obesity ‘the Terror Within’. Accessed July 30, 2013. <http://www.uthscsa.edu/hscnews/singleformat2.asp?newID=1381>.

⁶⁵ HSC NEWS - U.S. Surgeon General Carmona Calls Obesity ‘the Terror Within,’ HSC News - U.S. Surgeon General Carmona Calls Obesity ‘the Terror Within’. Accessed July 30, 2013. <http://www.uthscsa.edu/hscnews/singleformat2.asp?newID=1381>.

something about it, the magnitude of the dilemma will dwarf 9/11 or any other terrorist attempt” he said.⁶⁶ Where will our soldiers, sailors and airmen come from? Where will our police and firemen come from if the youngsters today are on a trajectory that says that they will be obese?

According to the First Responder’s foundation, an organization founded to assist in improving the health and wellness of First Responders throughout the United States, 75% of First Responders are overweight or obese as a result of the interruption of normal dietary patterns and sleep that is associated with shift work.⁶⁷⁶⁸ Researchers from Boston University School of Medicine (BUSM), Boston Medical Center, Harvard University, and Cambridge Health Alliance also found that more than 75% of emergency responder candidates for fire and ambulance services were obese.⁶⁹⁷⁰ Our ability to fight, defend a nation, and respond to its crises is becoming acutely compromised.

There are parallel issues affecting first responders, potential military recruits, active duty military members, and the Nation as a whole. The United States is and will continue to be significantly vulnerable if these trends continue. Currently of 22 industrialized countries, the U.S. has the highest level of obesity. Currently, two-thirds of Americans over age 20 are overweight.⁷¹ What also adds to this rapidly emerging problem is our shifting demography. Hispanics, specifically Mexican citizens, make up the largest influx of immigrants.⁷² And only recently (July, 2013), Mexico has eked

⁶⁶ Ibid.

⁶⁷ “Obesity,” First Responders Foundation. Accessed August 01, 2013. <http://www.1strf.org/fr-disease-states/obesity>.

⁶⁸ Stephanos Kales, Antonius Tsismenakis, Ce Zhang, Elpidoforos Soteriades, Blood pressure in firefighters, police officers, and other emergency responders. *Am J Hypertens*. 2009;22(1):11–20

⁶⁹ Gina M. Digravio, “Researchers Find Majority of Fire and Ambulance Recruits Overweight or Obese.” Boston University. March 19, 2009. Accessed August 08, 2013. <http://www.bu.edu/phpbin/news/releases/display.php?id=1795>.

⁷⁰ Tsismenakis, Antonios J., Costas A. Christophi, John W. Burrell, Aaron M. Kinney, Min Kim, and Stefanos N. Kales, “The Obesity Epidemic and Future Emergency Responders.” *Obesity* 17, no. 8 (March 19, 2009): 1648–650. doi:10.1038/oby.2009.63.

⁷¹ “Obesity Statistics - Worldometers.” Obesity Statistics - Worldometers. Accessed August 01, 2013. <http://www.worldometers.info/obesity/>.

⁷² James Lee, and Nancy Rytina, “Naturalizations in the United States: 2008.” Office of Immigration Statistics, March 2009. http://www.dhs.gov/xlibrary/assets/statistics/publications/natz_fr_2008.pdf.

ahead of the United States by percentage points as the world's most overweight nation. The United States is still the most obese nation in the world, but Mexico is the most overweight. From a national and homeland security perspective, significant challenges are ahead, if the world's most obese country is the world's second most obese country's provider of its immigrant population.

The discussion on what obesity actually is, its impact on a variety of health and performance issues, and how the Nation is negatively impacted on multiple fronts should indicate unequivocally that obesity, its impact, and its effects are a National and homeland security issue. "Obesity is the terror within," Richard Carmona, the then Surgeon General of the United States, said during a lecture at the University of South Carolina in 2004.⁷³

Obesity, its effects, its costs, and its impacts are far reaching, impact our readiness and resilience. It already impacts our current recruiting and its impacts cost hundreds of billions of dollars. And we are unable to admit that the causes of obesity are far more than simply eating too much and exercising too little. If that were the case, then the current methodology and remedy would have worked, and the trends and consequences would not be a national topic of discussion. Obesity impacts the complex tasks that democracies require: education, voting, individual ambition, foresight, et cetera. There is evidence that obesity impairs cognitive function and has also been linked to long-term decline in cognitive performance.⁷⁴ There is also evidence that obesity, combined with hypertension (an ancillary effect of obesity) lowers cognitive function in men.⁷⁵ Obesity

⁷³ "Obesity Bigger Threat Than Terrorism?" CBS NEWS. July 17, 2010. Accessed August 01, 2013. http://www.cbsnews.com/2100-204_162-1361849.html.

⁷⁴ Kelly M. Stanek, Gladys Strain, Michael Devlin, Ronald Cohen, Robert Paul, Ross D Crosby, James E. Mitchell, and John Gunstad, Body mass index and neurocognitive functioning across the adult lifespan. *Neuropsychology*, Vol 27(2), Mar 2013, 141–151 Accessed August 23, 2013. doi:10.1037/a0031988.2013

⁷⁵ M. F. Elias, P. K. Elias, L. M. Sullivan, P. A. Wolf, and R. B. D'Agostino, "Lower Cognitive Function in the Presence of Obesity and Hypertension: The Framingham Heart Study." *International Journal of Obesity* 27 (October 7, 2002): 260–68. Accessed August 23, 2013. doi:10.1038/sj.ijo.802225.

significantly increases growth plate injuries upwards of 75%,⁷⁶ increases lower back injuries,⁷⁷ and lower body injuries.⁷⁸ It renders those affected less ambulatory over time. Obesity also exacerbates sleep apnea and may lead to more clinical depression.

Obesity has become and will continue to be a national and international health crisis. According to the World Health Organization (WHO) in the last decade, approximately 1.6 billion adults over the age of 15 were overweight, at least 400 million adults were obese and at least 20 million children under the age of five years were overweight. Obesity is a significant global issue.

⁷⁶ Rushyuan J Lee, MD, Colleen Cullen, NP, Josefina S Baca-Asher, MD, Meredith A. Lazar-Antman, MD, and Arabella I. Leet, MD, “The Effect of Obesity on Pediatric Fractures: Obese Children More Likely to Suffer Growth Plate Fractures.” *The American Academy of Orthopaedic Surgeons; Obese Children More Likely to Suffer Growth Plate Fractures*. February 9, 2012. Accessed August 23, 2013.

⁷⁷ Shiri Rahman, Jaro Karppinen, Päivi Leino-Arjas, Svetlana Solovieva, and Eira Viikari-Juntura, *The Association Between Obesity and Low Back Pain: A Meta-Analysis*. *Am. J. Epidemiol.* (2010) 171 (2): 135–154 first published online December 11, 2009 doi:10.1093/aje/kwp356.

⁷⁸ D. L. Riddle, M. Pullsic, P. Pidcoe, and RE Johnson, “Risk Factors for Plantar Fasciitis: A Matched Case-control Study.” *The Journal of Joint and Bone Surgery A*, no. 5 (May 2003): 872–877.

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III. THE MECHANICS AND DYNAMICS OF OBESITY

If we were effective in demonstrating obesity as a homeland security issue in the previous chapter, then the next piece of the examination must be determining how this condition came to be. It is not merely identifying that the nation has become obese. We must also attempt to discern the mechanics, dynamics, causes, and definitions of what obesity is.

Obesity is defined by the World Health Organization (WHO) as abnormal or excessive fat accumulation that presents a risk to an individual's health. Obesity is the condition of an individual having excess, or too much visceral and subcutaneous adipose (body fat). If obesity rates continue on their current trajectories, by 2030, 13 states could have adult obesity rates above 60 percent, 39 states could have rates above 50 percent, and all 50 states could have rates above 44 percent.⁷⁹⁸⁰ Experts and current trend analysis estimates that by 2015 approximately 2.3 billion adults will be overweight and more than 700 million will be obese. The scale of the obesity problem has a number of serious consequences for individuals and government health systems.

Being overweight (better termed overfat) and obese are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. While it was once an issue only in high income countries, overweight and obesity has now dramatically risen in low- and middle-income countries.⁸¹ Such countries are now facing a “double burden” of disease, for while they continue to deal with the problems of infectious disease and under-nutrition, they are also experiencing a rapid upsurge in

⁷⁹ Robert Wood Johnson Foundation, “Adult Obesity Rates Could Exceed 60 Percent in 13 States by 2030, According to New Study.” RWJF. September 17, 2012. Accessed September 02, 2013. <http://www.rwjf.org/en/about-rwjf/newsroom/newsroom-content/2012/09/adult-obesity-rates-could-exceed-60-%-in-13-states-by-2030.html>.

⁸⁰ Jeffrey Levi, PhD, Laura M. Segal, MA, Kathryn Thomas, MJ, Rebecca St. Laurent, JD, Albert Lang, and Jack Rayburn, MPH, “F as in Fat.” F as in Fat: How Obesity Threatens America's Future 2012, August 2013, 2–3. Accessed September 02, 2013. [http://www.fasinfat.org/policy/F as in Fat: How Obesity Threatens America's Future 2012](http://www.fasinfat.org/policy/F%20as%20in%20Fat%20How%20Obesity%20Threatens%20America's%20Future%202012), a report released today by Trust for America's Health (TFAH) and the Robert Wood Johnson Foundation (RWJF).

⁸¹ “Obesity,” WHO. Accessed August 01, 2013. <http://www.who.int/topics/obesity/en/>.

chronic disease risk factors, such as obesity and overweight, particularly in urban settings.⁸²

Malnourishment and obesity often coexist side-by-side within the same country, the same community and even within the same household and this double burden is caused by inadequate prenatal, infant and young child nutrition followed by exposure to high-fat, energy-dense, micronutrient-poor foods. According to the National Institute of Health (NIH), the most useful and utilitarian measure of overweight and obesity is body mass index (BMI).

A. WHAT IS BMI?

The body mass index (BMI), or Quetelet index, is a measure for human body shape based on an individual's weight and height. It was devised between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing "social physics."⁸³ Body mass index is defined as the individual's body mass divided by the square of their height. The first federal guidelines on the identification, evaluation, and treatment of overweight and obesity in adults was recommended and released by the National Heart, Lung, and Blood Institute (NHLBI), in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).⁸⁴ These guidelines became universally accepted policy for identifying obesity.

Therefore, obesity, as it defined, is a growing public health problem that affects hundreds of millions of American adults—almost 70% of the population.⁸⁵

⁸² "Obesity: Developing World's New Burden," Obesity: Developing World's New Burden. Accessed August 01, 2013. <http://www.fao.org/focus/e/obesity/obes3.htm>.

⁸³ Adolphe Quetelet, (1796–1874).The Average Man and Indices of Obesity. Pubget." Adolphe Quetelet (1796–1874)--the Average Man and Indices of Obesity. - Pubget. Accessed August 01, 2013. <http://pubget.com/paper/17890752/adolphe-quetelet-1796-1874-the-average-man-and-indices-of-obesity>.

⁸⁴ NIH News Release -First Federal Obesity Clinical Guidelines Released - 06/17/1998, U.S National Library of Medicine. June 17, 1998. Accessed August 01, 2013. <http://www.nih.gov/news/pr/jun98/nhlbi-17.htm>.

⁸⁵ Centers for Disease Control and Prevention, May 30, 2013. Accessed August 01, 2013. <http://www.cdc.gov/nchs/fastats/overwt.htm>.

The BMI guidelines are based on an analysis and evidence that published scientific literature addresses as to how weight control, or lack thereof, increases the major risk factors of all chronic disease.

The guidelines' definition of overweight is based on research that relates body mass index to risk of death and illness. The panel that developed the guidelines identified being overweight as a BMI of 25 to 29.9 and obese as having a BMI of 30 and above, which is consistent with the definitions used in many other countries, and supports the *Dietary Guidelines for Americans* issued in 1995. Body Mass Index describes body weight relative to height and is strongly correlated with total body fat content in adults. According to the guidelines, a BMI of 30 is about 30 pounds overweight and is equivalent to 221 pounds in a 6' person and to 186 pounds in someone who is 5'6." The BMI numbers apply to both men and women.

B. MEASURING OBESITY

BMI provides a universally accepted, quick and useful data point measurement of the population. It enables one to have a quick and reasonable measure of overweight and obesity values. The BMI is effective in this regard because it is universal and can be used for both sexes and any age group. While BMI does not adequately account for lean body mass, somatyped mesomorphs, or athletes effectively, it is a reasonably scientific tool that enables one to make gross and rapid generalizations as to one's bodyweight and condition, generally speaking. Some very muscular people may have a high BMI without health risks.

Table 4 demonstrates the relationship of height and weight and assignment of a BMI. As weight increases along the height horizontal plane, the BMI increases. Numbers in the orange and red indicate a BMI that has been deemed obese and extremely obese.

Table 4. Body Mass Index Table

BMI HEIGHT	NORMAL					OVERWEIGHT					OBESE					EXTREME OBESITY																					
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
	4'10"	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258
	4'11"	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257	262	267
	5'0"	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276
	5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285
	5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295
	5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	276	282	287	293	299	304
	5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314
	5'5"	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334	
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344	
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354	
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365	
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376	
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386	
6'0"	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397	
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408	
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420	
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431	
6'4"	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443	

Source: Adapted from Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report

The World Health Organization (WHO) states that an adult who has a measured BMI between 25 and 29.9 as overweight, and an adult who has a measured BMI of 30 or higher is considered obese. A BMI below 18.5 is considered underweight, and a score between 18.5 to 24.9 a healthy range.

BMI provides the benchmark for individual assessments, but experts suspect that the risk of chronic disease in populations increases progressively from a BMI of 21 upwards. Again, the emphasis is on cross cut of populations. There are always outliers that may exceed the BMI calculation that are fit, healthy, and large. However, those are outliers.

Measuring overweight and obesity in children aged 5 to 14 years is challenging. The WHO Child Growth Standards includes BMI charts for infants and young children up to age 5. Childhood obesity is associated with a higher chance of premature death and disability in adulthood.

BMI ranges for children and teens are defined to take into account normal variances and differences in body fat percentages between boys and girls and differences

in body fat at various ages. However, although BMI correlates with the amount of body fat, BMI does not directly measure body fat. And as mentioned previously, extra consideration or secondary screening is usually undertaken to ensure those with an initial high BMI number are athletes and physical outliers.

Other methods of estimating body fat and body fat distribution include measurements of skin fold thickness, hydrostatic weighing, body impedance, waist circumference calculation of waist-to-hip circumference ratios, and techniques such as ultrasound, computed tomography, and magnetic resonance imaging (MRI).⁸⁶ All have relative efficacy.

C. CLINICAL RELEVANCE OF BMI

BMI is a gross indicator of total body fat in many individuals. Thus, it is considered as an indicator of health risk.

BMI is used by healthcare professionals to screen for overweight and obese individuals. The BMI is used to assess a person's health risks associated with obesity and overweight.

For example those with a high BMI tend to have higher risk of:

- high blood cholesterol or other lipid disorders
- Type 2 diabetes
- heart disease
- stroke
- high blood pressure
- certain cancers
- gallbladder disease
- sleep apnea and snoring
- osteoarthritis and joint disease
- premature death

⁸⁶ Body Fat Percentage, *Wikipedia*. July 31, 2013. Accessed August 01, 2013. http://en.wikipedia.org/wiki/Body_fat_percentage.

BMI, in conjunction with other data is used to develop a risk calculation. Other factors, such as ethnicity, gender, smoking, alcohol use, drug use, blood pressure, cholesterol level, blood sugar level, family history of heart disease, age, waist circumference, level of physical activity, menopause status, and other variables are taken into consideration while developing a risk portfolio.

D. IS BMI APPLICABLE FOR ALL?

For most people, BMI can be used to provide a good measure of obesity. But BMI fails to provide actual information on body composition like amount of muscle, bone, fat, and other tissues. There are always outliers.

In some people, BMI is a more accurate measure of body fat than others. For example, people who are very muscular may fall into the “overweight” category when they are actually healthy and very fit. These people with a very low body fat percentage could have the same BMI score as someone who is overweight.⁸⁷

Similarly, an elderly and frail individual person may be in the normal weight category when they have little muscle mass and a high percentage of body fat.

BMI, when used for children and adolescents who are still growing, those with large body frames or petite builds, pregnant women and highly muscled individuals thus need to be assessed and interpreted carefully. And, the Quetelet Index was termed the Body Mass Index in 1972 by Ancel Keys, a name that will appear throughout this document.

The use of BMI is not a panacea but a rapid means of gaining data points for further examination and recognition of risk.

⁸⁷ Rexford S. Ahima, and Mitchell A. Lazar, “The Health Risk of Obesity—Better Metrics Imperative.” *The Health Risk of Obesity—Better Metrics Imperative* 341, no. 6148 (August 23, 2013): 856–58. doi:10.1126/science.1241244.

IV. HOW DID WE GET OBESE?

In Chapter II, we established that obesity is a homeland and national security issue because it affects a growing number of Americans (more than one-third are obese and another one-third are overweight), and in Chapter III, we established how obesity is measured in general terms and some of obesity's deleterious effects on health. In this chapter, a historical perspective of how we became obese and those decisions, studies, and policy decisions will be discussed in hopes of demonstrating a clear path to the condition America finds itself in.

America has not always been fat. In fact, prior to World War II, many feared that Americans were, on the whole, malnourished. Harvey Levenstien reported in *Paradox of Plenty: A Social History of Eating in Modern America* that the armed services rejected 40% of the men drafted in 1941 for medical reasons.⁸⁸ Doctors attributed many of these ailments to inadequate nutrition. However, after World War II a change began to take place.

There are many thoughts and ideas with regard to the causes of obesity. Competing interests will be a recurring theme of this thesis. Nevertheless, our ability to defend a nation is becoming compromised.

The conventional wisdom of obesity rests with the energy balance hypothesis,⁸⁹ eat too much and do too little, or the gluttony and sloth hypothesis. The gluttony and sloth hypothesis is the idea that people get fat because they eat too much (gluttony) and exercise too little (sloth). The reason Americans and the world for that matter have become prodigiously overweight, and/or obese, is they are gluttons and sloths.⁹⁰ Over

⁸⁸ Crissie Reilly, "Good Eats: World War II Army Marched on Its Stomach." CECOM. May 15, 2009. http://cecom.army.mil/historian/pubArtifacts/Articles/2009-05-15_0800-FILE-Good_Eats.pdf.

⁸⁹ Kathleen M. Zelman, MPH, "Weight Control Secret: Energy Balance." WebMD. Accessed August 01, 2013. <http://www.webmd.com/diet/features/weight-control-secret-energy-balance>.

⁹⁰ Direct Causes: Too Much Food, Too Little Physical Activity, APHA. Accessed August 01, 2013. <http://www.apha.org/programs/resources/obesity/obesityrootdirect.htm>.

time, Americans' have become overindulged with a host or plethora of choices and consume too much.⁹¹ And, we do not exercise enough, or so it appears.

This idea of obesity is fairly simple and linked to the idea that calories are the root cause and rejects or greatly modifies the adaptation of adiposity and associated components of metabolism. In his book *Nutritionism; The Science and Politics of Dietary Advice*, author Gyorgy Scrinis points out that theories of diet and energy balance coincide with the idea that the body is a machine and all inputs and outputs can be accurately quantified mathematically, and therefore, humans are a quantified mechanical body.⁹² This begins the genesis of the calories in and out methodology. Mechanical versus biological. What if however, the human organism is so highly complex that it is not as simple as calories in and out but a series of both qualified and quantified endocrine and other system adaptations and operations that regulate weight?

Dr. Richard Feinman, PhD amplifies this possibility. Dr. Feinman is a professor of biochemistry and medical researcher at the State University of New York Health Science Center. It is Feinman's contention that the first law of thermodynamics (conservation of energy) is a book keeping law and does not differentiate how energy input or partitioning is divided between weight gain, work done, heat generation or storage of energy in different biomolecules. The second law is a dissipation law. It says that all (real) processes are inefficient. Feinman's point of view is a significantly different than the conventional wisdom⁹³ and offers a different perspective on the energy in/energy out idea of obesity and weight control.

There is a potential explanation for the exponential obesity trends this country is experiencing. Our nation and the world have grown obese because of what we eat and not the amount of food or a lack of exercise. It is the kind of food we consume and the

⁹¹ Dina Spector, "One Explanation For Why Americans Eat Too Much." Business Insider. May 14, 2012. Accessed August 01, 2013. <http://www.businessinsider.com/why-americans-overeat-2012>.

⁹² Gyorgy Scrinis, *Nutritionism: The Science and Politics of Dietary Advice*. Crows Nest, N.S.W.: Allen & Unwin, 2013. 2–4.

⁹³ Kathleen M. Zelman, MPH, "Weight Control Secret: Energy Balance." WebMD. Accessed August 01, 2013. <http://www.webmd.com/diet/features/weight-control-secret-energy-balance>.

unintended consequences of that food that has created this obesity environment⁹⁴ Exercise may actually increase appetite and does little to adequately control calorie expenditure. Obesity is a symptom of a more nefarious condition not the result of one.⁹⁵⁹⁶

There are many, many points of view with regard to what causes obesity and how America became obese. In a variety of opinions, there are champions and experts who are adamant with regard to the causes of obesity. While there may be contrasting points of view, motive, education, and opinion, they all have two things in common. The first is they all universally believe obesity is a significant problem for the United States. The second, at the most basic level of their respective arguments, is that they all believe refined carbohydrates play a critical role.

Dr. Dean Ornish, President and founder of the nonprofit Preventive Medicine Research Institute in Sausalito, California, as well as Clinical Professor of Medicine at the University of California, San Francisco, prescribes a very low fat, plant-based diet as the key to reducing body fat, reverse heart disease, and maintaining wellness.⁹⁷

Dr. Eric C. Westman,⁹⁸ Associate Professor in the Department of Medicine Division of General Internal Medicine at Duke University Medical Center prescribes a very high fat, low carbohydrate diet as the key to reducing body fat and maintaining wellness.

Dr. T. Colin Campbell,⁹⁹ a professor emeritus at Cornell University was the director *The China-Oxford-Cornell Diet and Health Project* or commercially available as

⁹⁴ Harvard School of Public Health, The Obesity Prevention Source » Toxic Food Environment, The Obesity Prevention Source. Accessed August 03, 2013. <http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/food-environment-and-obesity/>.

⁹⁵ B Swinburn, G. Egger, and F. Raza, National Center for Biotechnology Information. December 29, 1999. Accessed August 03, 2013. <http://www.ncbi.nlm.nih.gov/pubmed/10600438>, 563–570.

⁹⁶ TED: Ideas worth Spreading. Performed by Peter Attia, MD, MA. TED: Ideas worth Spreading. April 2013. Accessed August 03, 2013. http://www.ted.com/talks/peter_attia_what_if_we_re_wrong_about_diabetes.html.

⁹⁷ “Preventive Medicine Research Institute,” Accessed August 03, 2013. <http://www.pMRI.org/about.html>.

⁹⁸ Duke University Medicine Faculty, <http://medicine.duke.edu/faculty/details/0081489>.

⁹⁹ T. Colin Campbell, Wikipedia. July 28, 2013. Accessed August 03, 2013. http://en.wikipedia.org/wiki/T._Colin_Campbell.

the book *The China Study*,¹⁰⁰ postulates that dietary fat, specifically animal products, are the primary cause of the wide variety of chronic disease and that only a whole food diet devoid of dietary fat will cure our ails.¹⁰¹

Gary Taubes, a science writer and author of *Good Calories, Bad Calories; Why We Get Fat*; and the *Diet Delusion* is adamant that the introduction of refined carbohydrates into the American diet, scientific dogma, bad science, and politics are the reasons we have grown obese.¹⁰²

Dr. Robert Lustig,¹⁰³ a pediatric endocrinologist at the University of California, San Francisco (UCSF), also believes obesity is a toxic endocrine response to sugar, particularly fructose, and that it (fructose) exhibits the same characteristics as an illicit drug on reward and pleasure centers of the brain. His latest book, *Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity, and Disease* discusses this response to fructose and sugar.

Dr. Peter Attia, president and co-founder of the Nutrition Science Initiative (NuSI)¹⁰⁴ is a former McKinsey & Company consultant, where he was a member of both the corporate risk and healthcare practices. Prior to McKinsey, Attia spent five years at the Johns Hopkins Hospital as a general surgery resident. Attia is an advocate of increasing dietary fat, not excluding it in order to stay lean.¹⁰⁵ Attia is documented as

¹⁰⁰ T. Colin Campbell, T., "Diet, Life-style and Mortality in China. A Study of the Characteristics of 65 Chinese Counties: Chen J., Campbell T.C., Li J., Peto R. Oxford University Press, (Oxford, U.K.), Cornell University Press, (Ithaca, NY), People's Medical Publishing House (Beijing PRC), 894, 1991." [www.nutrition.cornell.edu/China Project](http://www.nutrition.cornell.edu/China%20Project). <http://web.archive.org/web/20090223222003>.

¹⁰¹ T. Colin Campbell, and Thomas M. Campbell, *The China Study: The Most Comprehensive Study of Nutrition Ever Conducted and the Startling Implications for Diet, Weight Loss and Long-term Health*. Dallas, TX: BenBella Books, 2005.

¹⁰² Gary Taubes, Biography. Accessed August 03, 2013. <http://garytaubes.com/biography/>.

¹⁰³ Robert H. Lustig, MD, and Robert H. Lustig, Accessed August 03, 2013. <http://www.ucsfbenioffchildrens.org/cgi-bin/expertDetail.cgi?doctorid=1721>.

¹⁰⁴ Peter Attia, MD/NuSI, Peter Attia MD/ NuSI Comments. Accessed August 03, 2013. <http://nusi.org/about-us/a-letter-from-the-founders/peter-attia/>.

¹⁰⁵ "About Me," The Eating Academy. Accessed August 03, 2013. <http://eatingacademy.com/dr-peter-attia>.

consuming 4,000-plus calories a day with a diet of almost 90% saturated fat with nothing but favorable outcomes.¹⁰⁶

Attia, much like Taubes' strongly believes that removing dietary fat from the diet and replacing it with refined carbohydrates was the critical component of the exponential rise in obesity. Both also advocate that excess calories are not the critical factor when it comes to obesity. The cognitive dissonance that Attia and Taubes' address is quite profound and completely contrary to United States Department of Agriculture (USDA), American Heart Association (AHA), and nutritional guidelines published in the United States.

Both Taubes' and Attia, as well as an emerging coalition of medical professionals, contend that fat does not make us fat. It is the increase in carbohydrates and particularly refined carbohydrates introduced into our diets approximately 40 years ago that are the reason for the staggering increase in obesity, Type 2 diabetes and host of chronic diseases and their secondary effects becoming the primary reason for death of Americans.¹⁰⁷

Dr. Michael Katz, director of The Yale-Griffin Prevention Research Center contends that it not just one thing that has led to obesity.¹⁰⁸ The Yale-Griffin Prevention Research Center funded by the CDC is somewhat at odds with the Yale Rudd Center for Food Policy and obesity in terms of the roots and causes of obesity.¹⁰⁹ So, the same University, Yale, has competing interests and centers with either competing and/or disparate interests when it comes to obesity.

¹⁰⁶ Peter Attia, "What I Eat The Eating Academy | Peter Attia, MD" The Eating Academy. December 2011. Accessed August 03, 2013. <http://eatingacademy.com/nutrition/what-i-actually-eat>.

¹⁰⁷ "The Top 10 Causes of Death," WHO. Accessed August 03, 2013. <http://www.who.int/mediacentre/factsheets/fs310/en/index2.html>.

¹⁰⁸ "Michael Katz/Meet the Staff, of the Yale-Griffin Prevention Research Center," Accessed August 03, 2013. <http://www.yalegriffinprc.org/About-Us/Meet-the-Staff.aspx>.

¹⁰⁹ Rudd Center for Food Policy & Obesity —Home." Rudd Center for Food Policy & Obesity — Home. Accessed August 03, 2013. <http://www.yaleruddcenter.org/>.

Michelle May, MD, author of *Am I Hungry? What to Do When Diets Don't Work* states that "Weight gain is so complicated; there are so many factors that can impact your weight. It is more likely a combination of things more than just one factor."¹¹⁰

The American Heart Association (AHA) says obesity is controlled by simply changing the balance of calories into calories out.¹¹¹

The American Beverage Association (ABA), Center for Consumer Freedom (CCF), McDonalds Inc., and the American Council for Fitness and Nutrition (ACFN) all state that weight control is about achieving a proper energy balance.¹¹²

There are obviously many points of view, professional, personal or otherwise with regard to how we became obese. The fact remains that we are obese and even through opinions and scientific points of view vary, one theme remains; the nation becomes increasingly obese because it changed their diet from animal products, fats, and regular food and one that eschewed carbohydrates to a diet that removed much of the fat from the diet, more than doubled carbohydrate consumption and began to rely heavily on processed foods as staples.

We have become increasingly obese because the types of food we eat and how the food has been prepared and procured converged in an initially disparate way. Combined with increased innovations that cascaded together, this phenomenon created a perfect storm of toxicity, cellular disruption, and altered metabolic activity to render us sick, tired, and fat. The phenomenon of metabolic syndrome or insulin sensitivity, the precursor of diabetes and obesity may be a symptom of diet and nothing more.¹¹³ The postulation that our standardized American diet, a product of American innovation,

¹¹⁰ "Eat What You Love. Love What You Eat, Am I Hungry?;" Mindful Eating Program by Michelle May MD. Accessed September 12, 2013. <http://amihungry.com/>.

¹¹¹ "Diet and Lifestyle Recommendations, Diet and Lifestyle Recommendations," March 13, 2013. Accessed August 03, 2013. http://www.heart.org/HEARTORG/GettingHealthy/Diet-and-Lifestyle-Recommendations_UCM_305855_Article.jsp.

¹¹² Michele Simon, "Personal Responsibility, Energy Balance, and Other Distractions." In *Appetite for Profit: How the Food Industry Undermines Our Health and How to Fight Back*, 30--32. New York: Nation Books, 2006.

¹¹³ "Metabolic Syndrome," Wikipedia. February 08, 2013. Accessed August 03, 2013. http://en.wikipedia.org/wiki/Metabolic_syndrome.

technology, and commoditization may have far more to do with our girth than merely eating more and doing less.

Americans enjoy a diverse abundance of low-cost food—spending a mere 9.4% of disposable income on food.¹¹⁴ In fact, the United States spends less on food per capita than any other country.¹¹⁵

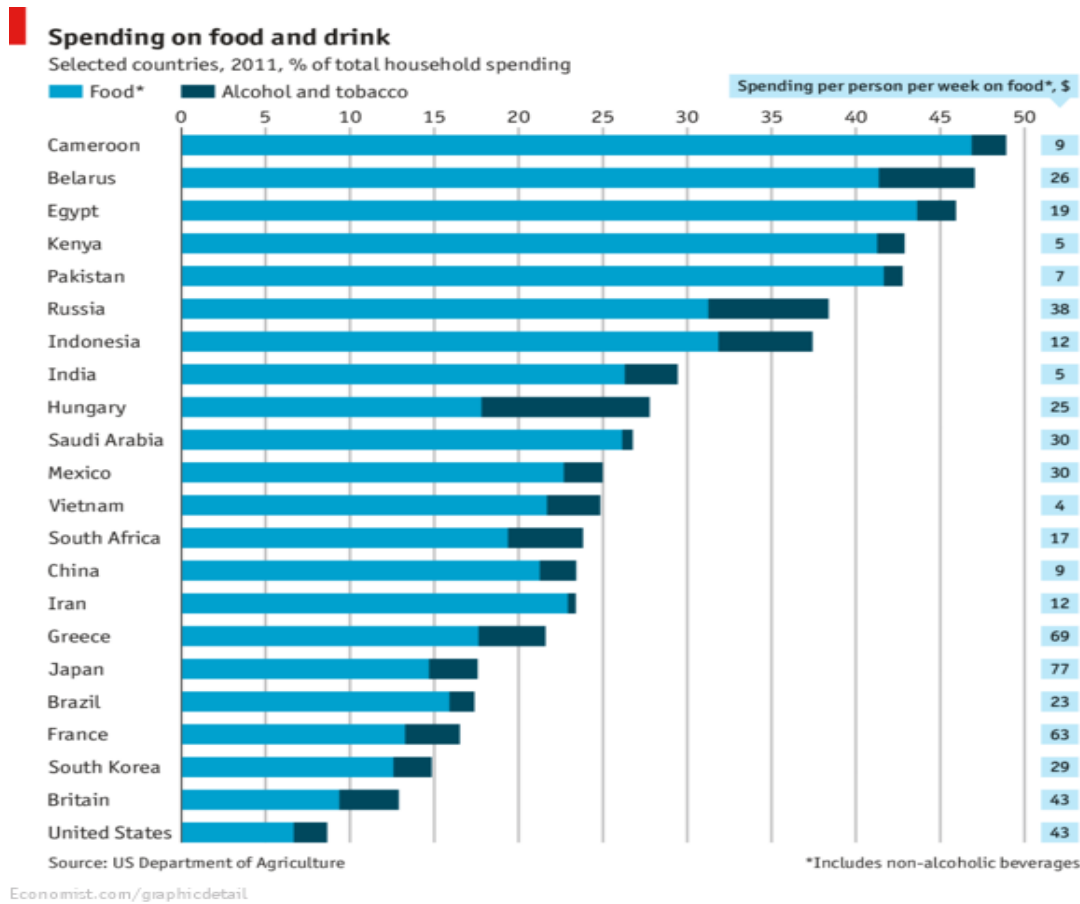


Figure 3. Spending on Food and Drink by Selected Countries. Source provided by *The Economist*.

¹¹⁴ USDA Economic Research Service (2010), Food CPI, Prices and Expenditures: Food Expenditures by Families and Individuals as a Share of Disposable Personal Income.

¹¹⁵ The Economist, March 12, 2013. Accessed August 03, 2013.
<http://www.economist.com/blogs/graphicdetail/2013/03/daily-chart-5>.

And no one eats more processed, junk, or fast foods than Americans.¹¹⁶¹¹⁷ No country has embraced the commercialized, processed, prepackaged food, and fast food lifestyle like America. Americans eat 31% more packaged food than fresh food and consume more processed food than any other country.¹¹⁸¹¹⁹

¹¹⁶ “Americans’ Food Choices at Home and Away: How Do They Compare With Recommendations?” USDA ERS -. February 21, 2013. Accessed August 03, 2013. <http://www.ers.usda.gov/amber-waves/2013-february/americans-food-choices-at-home-and-away.aspx>.

¹¹⁷ Hannah Fairfield, “Factory Food.” NY Times. April 3, 2010. <http://www.nytimes.com/2010/04/04/business/04metrics.html?ref=metrics>.

¹¹⁸ Ibid.

¹¹⁹ “Americans’ Food Choices at Home and Away: How Do They Compare With Recommendations?” USDA ERS. Accessed August 03, 2013. <http://www.ers.usda.gov/amber-waves/2013-february/americans-food-choices-at-home-and-away.aspx>.

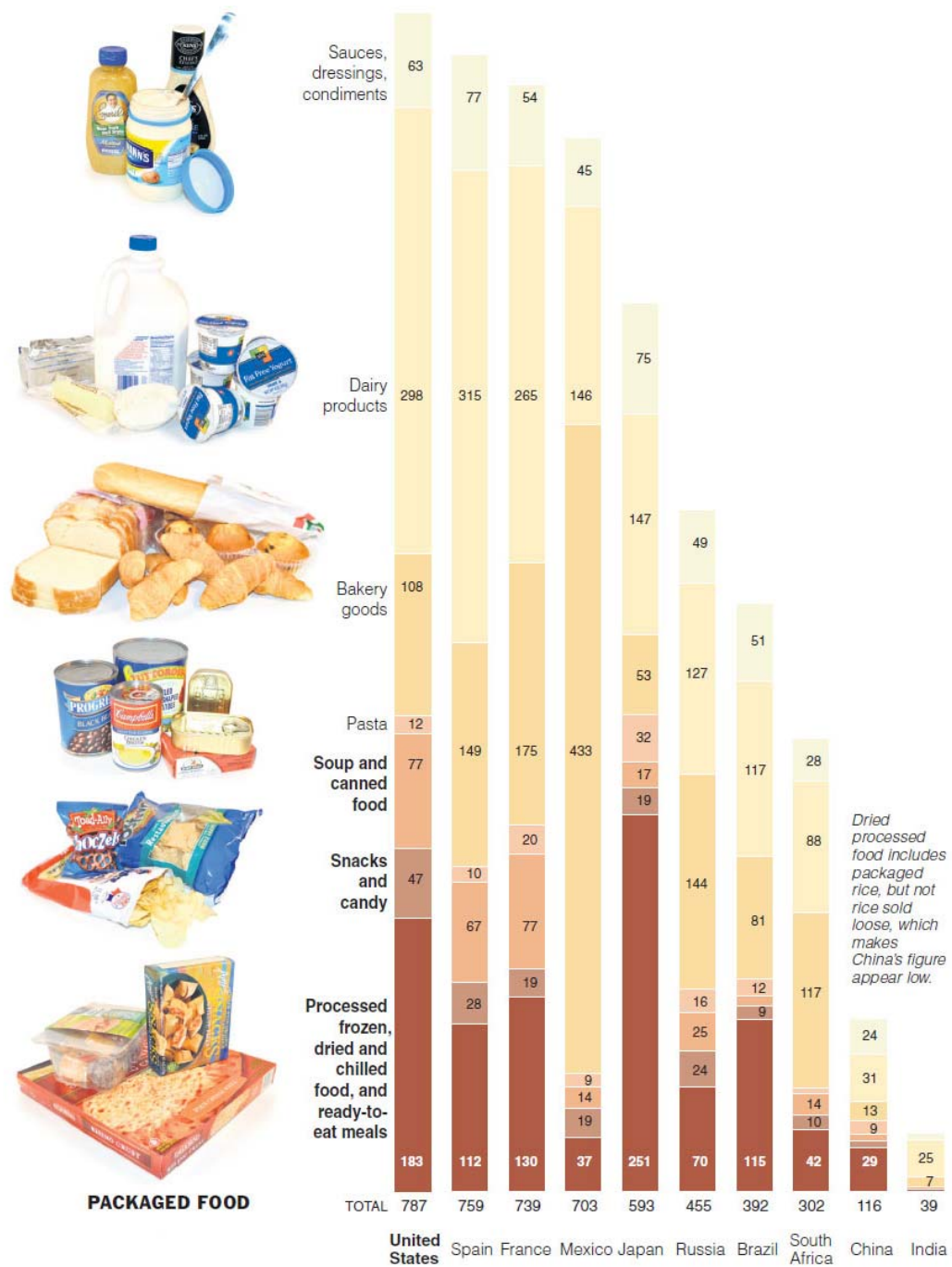


Figure 4. Factory Food Image provided from the *New York Times* business section, April 3, 2010

In that light, the introduction of several key innovators and leaders demonstrate how this nation came to rely on a very extended, refined, and arguably unsustainable food system. The following key players had tremendous impact on our food system. Each innovation and policy decision, while initially isolated, combined to create a food system that may be the leading culprit in the obesity challenge we are faced with.

V. THE POLICIES AND POLITICS OF OBESITY: WHO MADE U.S. FAT?

Immediately after World War II, the United States, largely intact and spared of the geographical scars of war and reaping the benefits of victory, set forth with many innovations and a vision to exploit their newly found position in the world. This prowess and wealth sparked many innovations and disruptions within the United States. However, innovation does have unintended consequences, much like technology. And with many interactions with both competing and shared systems, there are many opportunities to address. An innovation is also a solution to a disruption, whether planned or discovered.

In this chapter, we will see who led these innovations, making possible the convergence of many systems and made these innovations possible. Our food system has had some very significant innovations shape it. With any system, there are favorable and unfavorable orders or magnitudes of effects that are both hoped for and at the same time unforeseen. This convergence of systems, response to demand, and productivity was initiated in an amoral, unintended or simply happenstance environment.

It is this amalgam of situations that has created our current condition. Policy and political innovation seen in the present can be deemed revolutionary. The consequences can be seen as tragic. The following policy and political innovations, in and of themselves, were revolutionary and thought of as an extraordinary step forward. Perhaps in retrospect—not so.

There are key individuals who exercised a particular innovation and/or disruption that led to advancing the food system. There were also several key decisions; policy decisions that captured system innovations and exploited them for what appeared to be favorable outcomes. There are unintended consequences for all disruptions, and when these innovations and policies were combined, a new food system was created. This analysis is not an endeavor to affix blame. It is, however, an investigation of actors whose innovation(s), acumen, and policies had unintended consequences that have created the obesity situation that our Nation currently faces.

A. FRITZ HABER AND THE HABER BOSCH PROCESS

The changing food system and obesity has its roots in an unintended consequence of chemistry and war. The introduction of artificial nitrogen forever greatly altered the agriculture landscape. The process of synthesizing artificial nitrogen is known as the Haber-Bosch process. Fritz Haber was a German chemist, who received the Nobel Prize in Chemistry in 1918 for his development of synthesizing ammonia, important for fertilizers and explosives. He has also been described as the “father of chemical warfare” for his work in developing and deploying chlorine and other poisonous gases, such as phosgene, during World War I.

Haber developed the technique still used today to take the vast amount of nitrogen available in the atmosphere and convert it into nitrogen that plants can use for food. Ammonia, a synthesized compound of nitrogen and hydrogen, contributes significantly to the nutritional needs of terrestrial organisms by serving as a precursor to food and fertilizers. Ammonia, either directly or indirectly is also a building-block for the synthesis of many pharmaceuticals. It is in essence, plant steroids.¹²⁰

Previously, nitrogen was available in the form of various urea and animal waste product—manure. Keep in mind that prior to the introduction of the synthetic nitrogen, the preferred, or more aptly stated widely used method of nitrogen reintroduction back into the soil, was crop rotation. During crop rotation, certain plants are used for nitrogen fixation, that being introducing nitrogen back into the soil.¹²¹ Plants like Alfalfa, various legumes, and others are used to extract nitrogen from the air.¹²² Haber and his innovation of synthetic nitrogen made this method largely unnecessary.

¹²⁰ Vaclav Smil, “Detonator of the Population Explosion.” *Nature* 400, no. July (July 29, 1999): 415–16.

¹²¹ W. C. Lindemann, “Nitrogen Fixation by Legumes.” In *College of Agriculture, Consumer and Environmental Sciences*, New Mexico State University, by C. R. Glover. Las Cruces, NM.: New Mexico State University, 2003. Accessed May 1990. http://aces.nmsu.edu/pubs/_a/A129/.

¹²² Ran Lifshitz, Joseph W. Ran, Fran M. Kloepper, Fran M. Scher, Elizabeth M. Tipping, and Monique Laliberte, “Nitrogen-Fixing Pseudomonads Isolated from Roots of Plants Grown.” *www.nih.gov*. February 1986. 251–255 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC238855/pdf/aem00137-0041.pdf>.

Although nitrogen fertilizer had been previously available, this major leap forward allowed for the relatively inexpensive production of nitrogen fertilizer, which ultimately led to its widespread availability.

This initial process was important because it created a chemically synthesized product for explosives. During World War II, nitrogen was one of the prime components of Trinitrotoluene (TNT) and other high explosives, and the U.S. government built multiple plants to supply nitrogen for bombs. These plants were adept at creating large quantities of these synthetic chemicals. After the war, these plants were transitioned from the purely explosive manufacturing process to producing produced ammonia and nitrogen for fertilizer. This was clearly a great innovation and created an opportunity to induce higher and higher yields in agriculture.

What makes this innovation important was the understanding that plants that are grown for food or other uses that require 16 nutrients to be healthy.¹²³ The primary growth chemicals are nitrogen, phosphorus, and potassium, known by their periodic table symbols as. Secondary nutrients are calcium, magnesium and sulfur with boron, chlorine, copper, iron, manganese, molybdenum and zinc considered as micronutrients. All these chemicals did occur in various substrates naturally, but it was not until the end of World War II that the idea was to use them for enhanced agriculture growth. The processes used today to grow plants found their roots in a German chemists' discovery.

Today, virtually the entire agricultural industry, particularly the industrial agriculture industry relies on the Haber-Bosch process to produce nitrogen fertilizer.¹²⁴ Without the Haber-Bosch process, we would not be able to inexpensively feed our global population.¹²⁵ The Haber Bosch Process would be exploited to feed the world. With the introduction of synthetic nitrogen (fertilizer), industrialized agriculture also created opportunities to alter and modify existing staples for maximum yield and response New

¹²³ "Plant Nutrients," Plant Nutrients. Accessed August 03, 2013. <http://www.ncagr.gov/cyber/kidswrld/plant/nutrient.htm>.

¹²⁴ Industrial Agriculture/ The Pennsylvania State University, Welcome to the Dutton E-Education Institute! 2012. Accessed August 03, 2013. <https://www.e-education.psu.edu/geog030/node/358>.

¹²⁵ Ibid.

varieties, hybrids, and invariably genetically modified varieties of staple crops like wheat, maize (corn), soybeans, and rice were developed to respond disturbingly well to fertilizers and other industrial inputs. These innovations were exploited by Norman Borlaug.

B. NORMAN BORLAUG AND THE GREEN REVOLUTION

Norman Borlaug was an American agronomist, humanitarian, and Nobel laureate. He is one of six people to have won the Nobel Peace Prize, the Presidential Medal of Freedom and the Congressional Gold Medal. Norman Borlaug, the man who was credited with saving, or more aptly stated, feeding more human lives than anyone else in history. He is considered by many as the father of the Green Revolution, the dramatic improvement in agricultural productivity that swept the globe in the 1960s. Borlaug would utilize the Haber-Bosch innovation to enhance agricultural yields globally and be credited with feeding the world.

Borlaug was invited by the Rockefeller Institute to participate in a project in hopes of configuring a method to assist countries with building and maintaining agriculture. His first country was Mexico. Borlaug set out to teach the Mexican government, its farmers, and industry and its farmers to exploit and optimize their geography to grow and sustain their own crops.

The essence of the Green Revolution had been to bring high-yield industrial agriculture to nations around the world. One could make the case that this revolution was in response created during the Cold War as mechanism to demonstrate capitalism and American know how as superior to Communism.¹²⁶ And some argue that it continues. Indeed, the term Green Revolution may have been coined to refute the Red Revolution, the latter the ideology of movement towards communism. And that endeavor was led by Norman Borlaug.

¹²⁶ Sigrid Schmalzer, "Red Revolution/Green Revolution; Encounters with Scientific Farming." Sammlung. 2012. http://sass.uni-erlangen.de/index.php?option=com_content&view=article&id=101%3Aprojekt-schmalzer&catid=59%3Aprojekt&Itemid=90&lang=de.

Borlaug demonstrated that the Malthusian¹²⁷ pessimists could be thwarted by use of chemicals. Borlaug and his methodology created production that was contrary to biologist Paul Ehrlich who infamously wrote in his 1968 bestseller *The Population Bomb*.¹²⁸ “In the 1970s and 1980s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now.” The advent of Borlaug exploiting this methodology in fact did lead to a population bomb, but in another direction.

By 1968, when Ehrlich’s book appeared, the U.S. Agency for International Development (USAID) had already hailed Borlaug’s achievement as a “Green Revolution.” Between 1950 and 1984, the Green Revolution transformed traditional agriculture around the globe and increasing world grain production by 250%.¹²⁹ That production created a tremendous increase in the amount of available food energy for human consumption. And this explosion in available food was nearly tripled by the use of extensive use of pesticides, and fertilizers did indeed revolutionize the growing of wheat and crops in general, attaining yields that were 3–5 times what was previously harvested.

Borlaug and his team took these burgeoning conglomerations of technologies and began to educate and feed other exploding populations such as China, Africa, and India. It was a tremendous exercise in discipline, dedication, innovation, chemistry, and persistence. The effort was a noble one. His methods did feed the world. His methods are laudatory and demonstrate the “...the ongoing value of these investments simply by acknowledging the double-digit productivity gains made in corn and soybeans in much of the developed world. In the U.S., corn productivity has grown more than 40% and soybeans by nearly 30% from 1987 to 2007, while wheat has lagged behind, increasing

¹²⁷ Thomas R. Malthus, *An Essay on the Principle of Population*. London: J. Johnson, in St. Paul’s Church-yard. 1798. Library of Economics and Liberty [Online] available from <http://www.econlib.org/library/Malthus/malPop.html>; accessed 3 August 2013; Internet.

¹²⁸ Paul R. Ehrlich, “The Population Bomb.” New York: Ballantine Books, 1968.

¹²⁹ Constraints on the Expansion of Global Food Supply, Kindell, Henry H. and Pimentel, David, *Ambio* Vol. 23 No. 3, May 1994. The Royal Swedish Academy of Sciences. <http://www.dieoff.com/page36htm>.

by only 19% during the same period.¹³⁰ Clearly, this amount of growth and productivity would be beneficial to all.

Our own country was about to harness this great innovation for expanded production within the United States.

However, challenges were made as to the value and nutritional quality of the food and growth of monocultures. Miguel A. Altieri,¹³¹ (a pioneer of agro-ecology and peasant-advocate), pointed out that the exclusion of all other plants to the exception of cereal grains destroys traditional poly-culture farming and created monocultures. These monoculture crops are not grown for food but feed and deconstructed for inputs into other foodstuffs.¹³² This challenge will demonstrate itself as prophetic.

Farmers from all over the nation left for war and returned to the United States, but chose to stay in cities and not return to the farm. Veterans via the GI bill were entitled to financial support for education and vocational training, medical treatment, unemployment and loans for building houses or starting businesses.¹³³ This created a movement for more and more farm land to be consolidated and incorporated.¹³⁴ Inevitably, a change in policy and technology was deemed necessary to exploit the growing volume of land and Borlaug's agricultural prowess. A policy and personnel shift within the federal government would accelerate the Green revolution and Norman Borlaug's methodologies here in the United States.

¹³⁰ Norman Borlaug, "Farmers Can Feed the World." Wall Street Journal (New York), July 30, 2009, U.S. ed., Opinion sec.

¹³¹ Miguel Altieri, "Our Environment at Berkeley Department of Environmental Science Policy Management." Accessed August 03, 2013. http://ourenvironment.berkeley.edu/people_profiles/miguel-altieri/.

¹³² Russell Schoch, "A Conversation with Miguel Altieri Russell Schoch / California MonthlyJun01." A Conversation with Miguel Altieri Russell Schoch / California MonthlyJun01. June 2001. Accessed August 03, 2013. <http://www.mindfully.org/GE/GE2/Miguel-Altieri-Agroecology.htm>.

¹³³ Post World War II, January 14, 2008. Accessed August 03, 2013. <http://www.academicamerican.com/postww2/topics/postww2domestic.html>.

¹³⁴ Andrew Kimbrell, *The Fatal Harvest Reader: The Tragedy of Industrial Agriculture*. Washington: Published by the Foundation for Deep Ecology in Collaboration with Island Press, 2002. 92–106.

C. EARL BUTZ AND THE AGRICULTURAL POLICIES OF THE NIXON ADMINISTRATION

In 1971, President Richard Nixon reappointed Earl Butz as Secretary of Agriculture. In 1954, President Dwight D. Eisenhower had appointed Butz as Assistant Secretary of Agriculture. That same year Butz was also named chairman of the United States delegation to the Food and Agriculture Organization of the United Nations. He left both of the aforementioned posts in 1957, when he became the Dean of Agriculture at his alma mater, Purdue University. Nixon had begun his re-election process and at the same time hoped to de-escalate in Vietnam, remove America from the Gold Standard, and stabilize food prices to appeal to voters, particularly, women. Butz would be instrumental in keeping prices low for consumers, but at the same time, change farming forever.

The price of food and its production had begun to climb, reaching a 40-year high at one point during the Nixon administration. Nixon felt that Butz and his advocacy for policies that encouraged corporate or industrial farming ending or repurposing the New Deal programs could bring some stability to food prices. In his time, heading the United States Department of Agriculture (USDA), Butz revolutionized federal agricultural policy and re-engineered many farm support programs from the New Deal era. He abolished New Deal subsidies put in place to prevent surplus corn, and thereby, low prices. He was an advocate of large industrial based farming, creating foodstuffs as a commodity instead of merely “food.” Butz had put in place a financial incentive and subsidized mechanization to increase yields to such an extent that food was no longer the issue, but the commoditization of it was.

Butz’s mantra to farmers was “get big or get out,”¹³⁵ and he urged farmers to plant commodity crops like corn “from fencerow to fencerow.”¹³⁶ The ability to grow vast amounts of single crops, or monocrops, vastly increased volume and demonstrated the capabilities of scalable macro industrial agriculture. This is the birth of

¹³⁵ Shea Dean, “Children of the Corn Syrup.” *The Believer*, October 2003. Accessed August 18, 2012. http://www.believmag.com/issues/200310/?read=article_dean.

¹³⁶ “Planting Fence Row to Fence Row,” *Food System Wiki*/. Accessed August 03, 2013. [http://foodglossary.pbworks.com/w/page/49092319/Planting fence row to fence row](http://foodglossary.pbworks.com/w/page/49092319/Planting%20fence%20row%20to%20fence%20row).

agribusiness.¹³⁷ These policy shifts undid many of the New Deal agricultural policies that encouraged restraint¹³⁸ The Agricultural Adjustment Administration (AAA) (Pub.L. 73–10, 48 Stat. 31, enacted May 12, 1933) restricted agricultural production in the New Deal era by paying farmers to reduce crop area. Its purpose was to reduce crop surplus so as to effectively raise the value of crops, thereby a portion of their fields lie fallow.¹³⁹

The reversal of this act coincided with the rise of major agribusiness corporations, and the declining financial stability of the small family farm. It was also a time when food prices were beginning to soar to prices not seen in forty years. The commoditization of wheat, soybean, cotton, and corn incentivized the industrialization of production. This process initially created greater and greater yields of the commoditized product. It also destroyed the soil and radically changed farming.

Planting fencerow to fencerow annually with no change in the crop completely destroys the microorganism of the soil. Soil is not merely “dirt.”¹⁴⁰ Butz’s policies led to the worst soil erosion problems experienced since the Dust Bowl with more than two bushels of topsoil lost for every bushel of corn produced.¹⁴¹ With the soil “dying,” the inputs i.e., water, pesticides, chemicals, fertilizers, and herbicides usage increased. This input versus output demonstrated that with each introduction of chemical yields diminished. Therefore, each year more and more chemical (fertilizer, pesticide, herbicide,) was required to realize the same yield. This is aptly known as a “negative feedback loop.” Additional fertilizer was needed to maintain the same size crop yields. The soil became a medium to simply root plants instead of an organism sharing its micro and macro nutrients.

¹³⁷ “Agribusiness Development,” [Www.fao.org](http://www.fao.org/ag/ags/agribusiness-development/en/). Accessed August 03, 2013.
<http://www.fao.org/ag/ags/agribusiness-development/en/>.

¹³⁸ “Agricultural Adjustment Act,” N.p., n.d. Web. 03 Sept. 2013.

¹³⁹ Ibid.

¹⁴⁰ Aldo Leopold, Charles Walsh Schwartz, and Aldo Leopold, *A Sand County Almanac. With Other Essays on Conservation from Round River*. New York: Oxford University Press, 1966.

¹⁴¹ Shea Dean, “Children of the Corn Syrup. *The Believer*, October 2003. Accessed August 18, 2012.
http://www.believermag.com/issues/200310/?read=article_dean.

The volume of available food did stabilize some of the prices and create large amounts of surplus. In 1972, Russia, suffering multiple disastrous harvests, sought and received some 30 million tons of cereal grain.¹⁴² This created some political turmoil, but a financial windfall for farmers, especially those that grew wheat and corn.¹⁴³ Growth and surplus continued and as a commodity, there had to be a way to revalue the commodity for maximum return. Clearly there were significant, if not revolutionary, innovations within the exploitation of science, agriculture, logistics, and politics.

D. CORN: THE NEW CASH CROP

The now exploding industrial scale production of soybean, wheat, and corn created large surpluses and the largest surplus of all was in fact corn. Corn became so inexpensive to grow that other uses for it were sought. Corn yields became so abundant that without subsidies provided by the bi-annual Farm Bill legislation, the corn would be worthless than the inputs and time it took to produce. In excess of \$50 billion has been spent on corn subsidies and 90% of all subsidy payments have gone to corn, wheat, soybean, rice, and cotton.¹⁴⁴

The negative feedback loop again is demonstrated by this policy. Science and the food industry were pushed into action to determine what additional uses there was for corn. And the corn was abundant. Corn and its growth accelerant synthetic nitrogen, derived now from petroleum were akin to cash. Corn became a super crop, capable of many additional uses.

Corn was fed to cattle and hogs in lieu of grass, primarily because it fattened them quickly. It was added to practically every foodstuff available in a supermarket. Corn is in everything.¹⁴⁵

¹⁴² Michael Pollan, *The Omnivore's Dilemma: A Natural History of Four Meals*. New York: Penguin Press, 2006. Multiple chapters.

¹⁴³ *Ibid.*

¹⁴⁴ James Monke, "Farm Commodity Programs in the 2008 Farm Bill." National Ag Law Center.org. September 30, 2008. <http://www.nationalaglawcenter.org/assets/crs/RL34594.pdf>. 3.

¹⁴⁵ A. H. Jähren, and R. A. Kraft, "From the Cover: Carbon and Nitrogen Stable Isotopes in Fast Food: Signatures of Corn and Confinement." *Proceedings of the National Academy of Sciences* 105, no. 46 (2008): 17855–7860. doi:10.1073/pnas.0809870105.

The downside of this surplus corn infusion was that cows are pure herbivores and the large amount of corn feed created makes them sick.¹⁴⁶ This is the juncture where the introduction of antibiotics takes place. The combination of antibiotics and corn impacts the beef and protein industry very favorably. There was now more production of beef because it is grown on surplus grain. This production led to more red meat consumption. Hamburgers became bigger. Fast food restaurants, an odd novelty of American culture became ubiquitous. Even the use of chemically extracted corn oil had favorable economic impact. Corn became the engine for the massive surge in the quantities of cheaper food being supplied to American supermarkets: everything from cereals, to biscuits and flour found new uses for corn. Corn is ubiquitous.¹⁴⁷

As a result of Butz's free-market reforms, American farmers, almost overnight, went from parochial small town and regional producers to multimillion dollar enterprises with a global market. As demand for commoditized wheat, soybean and corn increased the ability of a farmer, who could not afford to industrialize diminished, and their land was purchased by larger conglomerates for the purpose of developing and exploiting economies of scale. And, it is in this process that corn would be found in some substrate, some form, and some way as an ingredient in practically everything.

This explosion created an unprecedented amount of product and opportunity. By the mid-70s, there was a growing and virtually worthless surplus of corn. And, as previously discussed, the reason for the declining value of these commodities is the inputs for wheat, soybean and especially corn farming cost more than the actual yield. Once again in an attempt to make farming an economy as opposed to a self-sustaining production, the Secretary of Agriculture was pressed into action. Earl Butz became aware of a revolutionary technique to render corn into a new sweetener. He flew to Japan to look into a scientific innovation that would change corn into development of high fructose corn syrup (HFCS), or glucose-fructose syrup.

¹⁴⁶ Doug Hamilton, "Modern Meat/Frontline." PBS/Frontline. April 18, 2002. Accessed August 03, 2013. <http://www.pbs.org/wgbh/pages/frontline/shows/meat/interviews/pollan.html>.

¹⁴⁷ Michael Pollan, *The Omnivore's Dilemma: A Natural History of Four Meals*. New York: Penguin Press, 2006.

E. THE NEW SUGAR/HIGH FRUCTOSE CORN SYRUP (HFCS)

High Fructose Corn Syrup (HFCS) was first introduced by Richard O. Marshall and Earl R. Kooi in 1957. They were, however, unsuccessful in making it viable for mass production.¹⁴⁸ The industrial production process and creation of this new technique was led by Dr. Yoshiyuki Takasaki at the Agency of Industrial Science and Technology of Ministry of International Trade and Industry of Japan.

Sweeter than sugar cane, HFCS is produced from surplus corn. The HFCS was also significantly cheaper than sugar and created a use for the corn surplus. In the United States, HFCS replaced sucrose (table sugar) in the food industry.¹⁴⁹ The HFCS is six times sweeter than cane sugar¹⁵⁰ and much less expensive than cane and beet sugar. Factors for this include governmental production quotas of domestic sugar, subsidies of U.S. corn, and an import tariff on foreign sugar, all of which combine to raise the price of sucrose to levels above those of the rest of the world, making HFCS cheaper for many sweetener applications. For example, corn subsidies in the United States from 1995–2012 totaled \$84.4 billion.¹⁵¹

HFCS was rapidly introduced to many processed foods and soft drinks in the U.S. from approximately 1975 to 1985. Dietary habits, shaped by the commoditization of soybean, wheat, and corn changed food production and consumption within the United States. The fat being removed from food was being replaced by sugar. Food was no longer food per se, but food products tweaked, modified, maneuvered, and sweetened for maximum palatability.

¹⁴⁸ R. O. Marshall, E. R. Kooi, and G. M. Moffett, (1957), “Enzymatic Conversion of d-Glucose to d-Fructose.” *Science* 125 (3249): 648–649.

¹⁴⁹ George A. Bray, 2004 .U.S. Department of Agriculture, Economic Research Service, Sugar and Sweetener Yearbook series, Tables 50–52).

¹⁵⁰ Fernando Gomez-Pinilla, and Rahul Agrawal, “Metabolic Syndrome’ in the Brain: Deficiency in Omega-3 Fatty Acid Exacerbates Dysfunctions in Insulin Receptor Signalling and Cognition.” National Center for Biotechnology Information. April 2, 2012. Accessed August 03, 2013. <http://www.ncbi.nlm.nih.gov/pubmed/22473784>.

¹⁵¹ “2012 Farm Subsidy Database, EWG Farm Subsidy Database. Accessed August 03, 2013. <http://farm.ewg.org/progdetail.php?fips=00000>.

Snacking also became a suggested methodology to maintain energy throughout the day. Soon we saw an increase in all kinds of sugary and sweet products. And the general public was convinced that these changes were in their best health interests. This is where the “Snackwell” phenomenon was born.¹⁵²

Marion Nestle and Walter Willet both aptly explain the phenomenon. Marion Nestle is the Paulette Goddard Professor of Nutrition, Food Studies, and Public Health, New York University. Walter Willet is the Fredrick John Stare Professor of Epidemiology and Nutrition, Chair, Department of Nutrition, Harvard University. Snackwell was a cookie that advertised itself as a low fat or no fat food. The issue was that the fat was replaced with carbohydrates. These carbohydrates were highly refined and when combined with other highly refined macronutrients became as calorically dense as the ones they were supposed to replace. And their nutritional value was further diminished due to their refined inputs of carbohydrates.¹⁵³

These innovations were revolutionizing how America and the world would eat. In short order, sugar would be used to replace dietary fats in all foods and drive sugar consumption to unprecedented levels. One of the key reasons for this was the recommendations of the McGovern Committee.

At the same time, this food revolution was taking place, a committee was meeting that would have even more profound impact on the food industry. The United States Senate Select Committee on Nutrition and Human Needs, or better known as the McGovern committee, sought out a remedy to feed malnourished Americans.¹⁵⁴⁻¹⁵⁵

¹⁵² “Did Low Fat Diets Make Us Fat?” PBS. April 8, 2004. Accessed August 03, 2013. <http://www.pbs.org/wgbh/pages/frontline/shows/diet/themes/lowfat.html>.

¹⁵³ “Did Low Fat Diets Make Us Fat?” PBS. April 8, 2004. Accessed August 03, 2013. <http://www.pbs.org/wgbh/pages/frontline/shows/diet/themes/lowfat.html>.

¹⁵⁴ “HISTORY OF DIETARY GUIDELINES FOR AMERICANS; APPENDIX I,” Health.Gov. Accessed August 03, 2013. <http://www.health.gov/dietaryguidelines/dga95/12dietap.htm>.

¹⁵⁵ Report of the DGAC on the Dietary Guidelines for Americans; Appendix E-4: History of the Dietary Guidelines for Americans, <http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/DGAC/Report/E-Appendix-E-4-History.pdf>.

In January 1977, after having held hearings on the malnourishment, the committee shifted its focus to the national diet as a means of perpetuating the committee's existence. The McGovern committee issued a new set of nutritional guidelines as a means to combat what appeared to be the Nations' leading killer conditions of heart disease, certain cancers, stroke, high blood pressure, obesity, diabetes, and arteriosclerosis.

F. THE AMERICAN DIETARY NEEDS AND THE IMPACT OF THE MCGOVERN COMMITTEE

Did this committee ignore science or is low fat diet a viable obesity intervention?

Titled Dietary Goals for the United States, but also known as the "McGovern Report," the panel suggested that Americans eat significantly less fat, significantly less cholesterol, less refined and processed sugars, and more complex carbohydrates and fiber. The recommended methodology of accomplishing this dietary shift was to eat more fruits, vegetables, and whole grains, and less high-fat meat, egg, and dairy products.¹⁵⁶ The key concept to understand here is that the Dietary Guidelines for the United States was not a scientific document; it was a political one.

This panel was a watershed on a variety of fronts, controversial, and suspect all at the same time. The McGovern panel, acting on much of the lipid hypothesis of Dr. Ancel Keys began to attack dietary fat as the leading culprit of the aforementioned chronic diseases.¹⁵⁷ It was this idea coupled with the seven- country study that led Keys' to speculate that dietary fat was the primary reason for the increase in chronic disease.¹⁵⁸ In the case of dietary fat, Keys, a diet researcher became convinced in the 1950s that Americans were suffering from a new epidemic of heart disease because they were eating

¹⁵⁶ Report of the DGAC on the Dietary Guidelines for Americans; Appendix E-4: History of the Dietary Guidelines for Americans, <http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/DGAC/Report/E-Appendix-E-4-History.pdf>.

¹⁵⁷ Jason Andrade, Aneez Mohamed, Jiri Frohlich, and Andrew Ignaszewski, "Ancel Keys and the Lipid Hypothesis: From Early Breakthroughs to Current Management of Dyslipidemia." *British Columbia Medical Journal* 51, no. 2 (March 2009): 66–72.

¹⁵⁸ Ancel Keys (ed), *Coronary heart disease in seven countries*. *Circulation* 1970; 41(4S1):1–198.

more fat than their ancestors. Several of the panel members vigorously disagreed with this hypothesis. However, those panel members who disagreed with the Keys' lipid hypothesis and low fat dietary guidelines were rejected and accused of having their positions shaped by financial interests. The decision of this committee would shape the American diet for the next 40-plus years.

“We don’t have the luxury of time to find the truth before making policy...”

The McGovern Report, 1977
U.S. Senate Select Committee on Nutrition and Human Needs

Dr. Ancel Keys, the lipid hypothesis, and influence on the McGovern Report

Ancel Keys was the author of the groundbreaking work on starvation: “The Minnesota Starvation Experiment.” This coupled with his ideas on energy and energy concentration also made him famous for the “K” ration. Keys’ hypothesized that fat, particularly saturated fat, was the primary cause of atherosclerosis.

Keys started promoting a low fat diet to lower cholesterol levels. Keys became convinced that there was linkage between fat intake, cholesterol and heart disease. His Seven Countries study was the genesis of his hypothesis that dietary fat was deleterious to health.¹⁵⁹ Keys’ would later be characterized as demonstrating a behavior not suited for a research scientist and modifying or cherry picking his data points and shaping the conclusions to meet his hypothesis.¹⁶⁰ In a July 1957 study, doctors Yerushalmy and Hilleboe stated that when additional and nonconfirming data is added to the research set,

¹⁵⁹ Ancel Keys, Aravanis C, Blackburn HW, Van Buchem FSP, Buzina R, Djordjevic BS, Dontas AS, F. Fidanza, M. J. Karvonen, N. Kimura, D. Lekos, M. Monti, V. Puddu, and H. L. Taylor, Epidemiologic studies related to coronary heart disease: characteristics of men aged 40–59 in seven countries. *Acta Med Scand* 1967 (Suppl to vol. 460) 1–392.

¹⁶⁰ Henry Blackburn, “Overview: The Seven Countries Study in Brief.” School of Public Health University of Minnesota RSS. Accessed August 03, 2013. <http://www.sph.umn.edu/epi/history/overview/>.

the connection Keys' professed seems to become less clear.¹⁶¹ Nevertheless, Dr. Keys and his work remains a key ingredient in the transition of the American diet to a high carbohydrate, low fat diet.

Keys' was sure that his lipid hypothesis was correct. According to Gary Taubes, author of Good Calories, Bad Calories, The Diet Delusion, and Why We Get Fat, Keys' theories were initially dismissed because there was no correlation between dietary fat and heart disease. The evidence that dietary fat correlates with heart disease "does not stand up to critical examination," the American Heart Association concluded in 1957.¹⁶² Shortly thereafter however, The American Heart Association, now with Keys as a board member accepted Keys' argument and the carbohydrate lifestyle would follow in short order.

Along with Keys' disposition on fat was the input of Dr. Mark Hegsted.¹⁶³ Dr. Mark Hegsted was a well-known Harvard Nutritionist and vegetarian.¹⁶⁴¹⁶⁵ Hegsted had also studied fat and cholesterol metabolism in the early 1960s, and he believed unconditionally in the benefits of restricting fat intake. His work, along with Dr. Keys, would be the impetus for shaping the restriction of dietary fat.¹⁶⁶ Both Keys and Hegsted had their own particular formulas that were used to hypothesize on the increase of heart disease.

The committee torn by the contradictions in the science, as well as the diametrically opposed scientific viewpoints, dismissed the notion that dietary fat was

¹⁶¹ J. Yerushalmy, and H. Hilleboe, July 1957, Fat in the diet and mortality from heart disease; a methodologic note. *New York State Journal of Medicine*, (14): 2343–2354.

¹⁶² John Tierney, "Diet and Fat: A Severe Case of Mistaken Consensus." *New York Times* (New York), October 9, 2007, U.S. ed., Science sec.

¹⁶³ D. Mark Hegsted, Wikipedia. May 28, 2013. Accessed August 03, 2013. http://en.wikipedia.org/wiki/D._Mark_Hegsted.

¹⁶⁴ "Harvard School of Public Health » HSPH News » D. Mark Hegsted, National Force in Science of Human Nutrition, Dies," HSPH News. June 19, 2009. Accessed August 03, 2013. <http://www.hsph.harvard.edu/news/press-releases/d-mark-hegsted-national-force-in-science-of-human-nutrition-dies/>.

¹⁶⁵ Marion Nestle, Comment on "In Memoriam: Mark Hegsted, 1914–2009." *Food Politics* (web log), August 18, 2009. <http://www.foodpolitics.com/wp-content/uploads/Hegsted.pdf>.

¹⁶⁶ Yu, Shaomei, and Penny M. Kris-Etherton, "Individual fatty Acid Effects on Plasma lipids and." *American Journal of Clinical Nutrition*. May 1997. doi:1628S-1644S.

necessary and that there was no evidence provided from eight studies and nearly 5,000 patients who demonstrated no conclusive dietary data. Nonetheless, the primary author of the Dietary Goals for the United States¹⁶⁷ was another vegetarian and advocate for Hegsted named Nick Mottern. Mottern believed his writing of the Dietary Goals for the United States writing would launch a “revolution in diet and agriculture in this country.”¹⁶⁸ Mottern bypassed all contradictory evidence and accepted all favorable evidence for dietary fat and utilized as his primary resource the research and opinion of Dr. Hegsted.¹⁶⁹

However, implementations of these guidelines were not within the purview of this body. Instead, an Undersecretary of the Department of Agriculture (USDA), Carol Tucker Foreman, an early advocate of the low fat, high carbohydrate dietary guidelines as a means to reduce heart and other chronic disease set forth to implement these recommendations. Foreman approached Phillip Handler, the President of the National Academy of Sciences for a recommendation to hire someone and help implement this radical dietary change. Handler intimated to Foreman that the report was “nonsense.”¹⁷⁰

Foreman chose to ignore the recommendations of Hander and subsequently hired Hegsted to implement and further develop a set of national dietary guidelines. In 1978, Hegsted was hired by the Department of Agriculture as the Administrator of Human Nutrition, serving in that post until 1982. The Department of Agriculture’s advice against eating too much fat was issued in 1980 and would later be formulated into the 65% carbohydrate, limited dietary fat food pyramid. Foreman would go on to become a lobbyist for Philip Morris, Monsanto, Proctor and Gamble, DuPont and Consumer Federation of America’s (CFA) Food Policy Institute.¹⁷¹

¹⁶⁷ U.S. Congress. McGovern Committee, 95 Cong., 1st sess. Cong. Rept. U.S. GOVT, 1977.

¹⁶⁸ Gary Taubes, “The Soft Science of Dietary Fat.” *SCIENCE* 291 (March 2001): 2536–545.

¹⁶⁹ Marion Nestle, Comment on “In Memorium: Mark Hegsted, 1914–2009.” *Food Politics* (web log), August 18, 2009. <http://www.foodpolitics.com/wp-content/uploads/Hegsted.pdf>.

¹⁷⁰ *Ibid.*

¹⁷¹ Carol Tucker Foreman, Source Watch. Accessed August 03, 2013. http://www.sourcewatch.org/index.php?title=Carol_Tucker_Foreman.

Keys' influence and point of view became instrumental in influencing first the doctrine then the dogma of health, consumption of fat, and weight loss, with no legitimized findings or data. Soon after the first recommendation for increasing carbohydrates to upwards of 65% of one's diet were recommended with reduction of fat to less than 1/3 of a daily allowance of calories and saturated fat to be as low as 10% of a diet. This report also strongly suggested with the increase of carbohydrates should coincide with a steep reduction in consumption of beef, eggs, butter, and other animal products.

Keys' impact on low fat/high carbohydrate findings resulted in the crusade against dietary fat. His influence combined with Hegsted's "food pyramid" and the McGovern Committee and dietary guidelines shaped the way toward low fat, high-carbohydrate diets. While Keys' maintained the low fat advocacy, his research was not without controversy. His methodology, findings, and research methodology have been roundly criticized in peer-reviewed published literature. And as previously stated, researchers Yerushalmy and Hilleboe, using Keys' published data-sets, pointed out that the data also demonstrates stronger positive correlation exists with sugar as well, but was ignored.¹⁷²

This recommendation met with fierce push back and threats of retaliation and other disparaging activity from a variety of industries.¹⁷³ In short order, the guidelines became softened in terms of recommendations against animal products but kept intact the recommendations for the very high carbohydrate low dietary fat diet.¹⁷⁴ Soon thereafter, the recommendations were formulated into a guideline that effectively became known as the food pyramid.

¹⁷² J. Yerushalmy, and H. E. Hilleboe, 1957. Fat in the diet and mortality from heart disease. A methodologic note. *New York State Med. Jour.* 57:2343–2354.

¹⁷³ Marion Nestle, (2007). *Food Politics: How the Food Industry Influences Nutrition and Health* (2nd ed.). University of California Press. 38–42.

¹⁷⁴ Marion Nestle, (2007). *Food Politics: How the Food Industry Influences Nutrition and Health* (2nd ed.). University of California Press. 38–42.

One of these dietary recommendations harshest critics, and also one of Keys' fiercest rivals, was Dr. John Yudkin.¹⁷⁵ Yudkin was a British scientist who held the opposite point of view of Keys and Hegsted. Yudkin believed that sugar, not dietary or saturated fat, was the primary dietary factor in creating the conditions for arteriosclerosis and/or heart disease.¹⁷⁶ He further hypothesized that carbohydrate intake, specifically refined sugar and carbohydrates were the primary culprits that created the conditions for obesity, diabetes, high blood pressure and heart disease.

Yudkin had conducted his own academic and clinical study in 1957, in which he surmised that the death rate from coronary disease in fifteen countries was correlated in relation to the average intake of sugar. The study resulted in the postulate that men who had consumed large amounts (no specific amount) of sugar had far greater propensity to develop heart disease as opposed to those who did not consume copious amounts of sugar. He was subsequently pilloried by the growing anti-fat community.

G. SUPERSIZE

What is supersizing? According to *Merriam Webster*, supersizing is the practice of considerably increasing the size, amount, or extent of something. Supersizing was a means of exploiting the economies of scale developed by the convergence of industry and food. The abundant amounts of food, the inexpensive HFCS, and America's growing appetite for fast and industrialized junk food would all lead us to gain weight. Supersizing was the idea of David Wallerstein, a McDonald's executive who had formerly worked for a chain of movie theaters in the 1950s and 1960s. While working at the movie theaters, Wallerstein was tasked with boosting sales of popcorn and soda. Wallerstein discovered that it was very difficult to persuade customers to purchase more than one soda or bag of popcorn.¹⁷⁷

¹⁷⁵ John Yudkin, Wikipedia. June 17, 2013. Accessed August 03, 2013.
http://en.wikipedia.org/wiki/John_Yudkin.

¹⁷⁶ John Yudkin, *Pure, White, and Deadly: How Sugar Is Killing Us and What We Can Do to Stop It*. Viking Press, London England, 1986.

¹⁷⁷ Michael Pollan, "The Republic of Fat." *The Omnivore's Dilemma: A Natural History of Four Meals*. New York: Penguin, 2006. 94–95. Print.

Wallerstein's nearly 40-year-career at the Balaban and Katz theater chain enabled his introduction of innovations included the introduction of butter on popcorn and ice in soft drinks at concession stands.

"I soon discovered that customers could be persuaded to pay for more up front," Wallerstein was fond of saying. Although McDonald's executive Ray Kroc was initially skeptical of Wallerstein's proposal to supersize McDonald's meals (believing that people who wanted more fries would buy two bags), he eventually agreed to try Wallerstein's idea. The sales results led to the program being rolled out in the 1990s throughout McDonald's restaurants." "From his days in operating movie theaters, he brought us a finely honed sense of customer responsiveness," former McDonald's Chairman Fred Turner said at the time of Wallerstein's death, reflecting on his "encouragement to us to offer McDonald's products in sizes to match customer preferences."¹⁷⁸

Once supersizing was combined with cheap food, and the government advising its citizens to avoid fats, it was only a matter of time before economics would drive consumption and production. With most of the calories we now consume being carbohydrates, one simply has to follow the money to see why the status quo cannot be disrupted.

H. THE EXERCISE MYTHOLOGY

Do we have to exercise to lose weight? Exercise and its role in weight control. Mixed in this conglomeration of food policy and politics was the recommendations of Dr. Jean Mayer. Mayer was a nutritionist and "physiological chemist," and was credited with the discovery that exercise is required for weight loss, as well as the theme of weight gain being a mere calorie in versus calorie out process. Jean Mayer first postulated and pioneered the exercise and weight-loss theology that many people today consider axiomatic.

¹⁷⁸ Phil Rosenthal, "Chicagoan David Wallerstein, Who Gave the World Large Fries at McDonald's, Knew How to Size up the Buying Public." Chicago Tribune. N.p., 13 June 2012. Web. 03 Sept. 2013.

Based on some observations and his own studies (two), Mayer cited “sedentary living” as the “most important factor” in obesity, and, for that matter, all other adverse health conditions appertaining thereunto. “Modern people,” said Mayer, “are inert compared with their ancestors [who were] constantly engaged in hard physical labor.... The development of obesity is to a large extent the result of the lack of foresight of a civilisation [sic] which spends billions annually on cars, but is unwilling to include a swimming pool and tennis courts in the plans of every school” (Jean Mayer, 1968).

In 1977, coinciding with Mayer’s crusade, the New York Times spoke of the “exercise explosion” that had come about because the conventional wisdom of the sixties, that being exercise had a deleterious effect on people was transformed to the same exercise now being necessary and exceptionally good for people.¹⁷⁹ The Washington Post as well estimated that “100 million Americans were partaking in the new fitness revolution”—coincident with the start of the current obesity epidemic. This is the genesis of the new “exercise more and eat less for weight control” dogma. The very idea that exercise has a favorable role in weight reduction is at least a 150 year-old idea that routinely gets proven inaccurate, misleading, and potentially a cause for weight gain.¹⁸⁰

Still, no matter how many people have come to believe the exercise-weight loss connection, the evidence that exercise promotes weight loss has simply never been produced. There is ample evidence to suggest that the reason our obesity levels have risen by 300% has little to do with activity or lack thereof. There is research that demonstrates that our Basal Metabolic Rate (BMR) has not changed much more than our ancestors.¹⁸¹

¹⁷⁹ “The Scientist and the Stairmaster,” NYMag.com. September 24, 2007. Accessed August 03, 2013. <http://nymag.com/news/sports/38001/index1.html>.

¹⁸⁰ Thomas King Chambers. *Corpulence: Or, Excess of Fat in the Human Body*. London: Longman, Brown, Green, and Longmans, 1850. 23–25.

¹⁸¹ Herman Pontzer, David A. Raichlen, Brian M. Wood, Audax Z. P. Mabulla, Susan B. Racette, and Frank W. Marlowe, (2012). Hunter-Gatherer Energetics and Human Obesity. *PLoS ONE* 7(7): e40503. doi:10.1371/journal.pone.0040503.

There are also studies that demonstrate children exercise patterns have not changed either.¹⁸²

A study carried out on approximately 300 schoolchildren in Plymouth, England found that the amount of exercise a child does is not correlated with their Body Mass Index. Even a tenfold increase in physical activity did not protect against obesity.¹⁸³ The findings could mean that the obesity epidemic amongst children is caused more by what they eat than lack of exercise.¹⁸⁴ In fact obesity may cause a reduction in activity, not the inverse.¹⁸⁵¹⁸⁶ These studies and several others demonstrate that activity measurement is a poor choice for weight modulation. Scientists in this study surmised that “active, ‘traditional’ lifestyles were not a panacea for regulating obesity.”¹⁸⁷

In yet another study, some 30 adults were recruited from the Hadza hunter-gatherer society, a small population living in the East African country of Tanzania. While no society can mirror our ancestors of millennia ago, researchers believed the Hadza shared significant similarities with our Pleistocene-era forbears. The Hadza maintain what could be described as a foraging or hunter gather lifestyle. Use of sticks, hatchets, bows, and rocks as weapons all the while navigating the terrain by foot, the Hadza subsist on everything they catch, kill, and harvest from nature.

The study demonstrated that the average daily energy expenditure of the traditional Hadza foragers was similar anthropologically to hunter gatherers of antiquity

¹⁸² Brad S. Metcalf, Linda D.Voss, Joanne, Hosking, Alison N. Jeffery, and Terence J Wilkin, Physical activity at the government-recommended level and obesity-related health outcomes: a longitudinal study (EarlyBird 37) Archives of Disease in Childhood Published Online First: 30 June 2008 doi:10.1136/adc.2007.135012.

¹⁸³ Ibid.

¹⁸⁴ Brad S. Metcalf, Linda D.Voss, Joanne, Hosking, Alison N. Jeffery, and Terence J Wilkin, “Fatness Leads to Inactivity, but Inactivity Does Not Lead to Fatness: A Longitudinal Study in Children (EarlyBird 45).” Archives of Disease in Childhood 96, no. 10 (2011): 942–47. doi:10.1136/adc.2009.175927.

¹⁸⁵ Ibid.

¹⁸⁶ “Childhood Obesity Leads to Lack of Exercise Not Other Way Round Says New Research,” Medical News Today. July 08, 2010. Accessed August 03, 2013. <http://www.medicalnewstoday.com/articles/194071.php>.

¹⁸⁷ Gretchen Reynolds, “Dieting vs. Exercise for Weight Loss.” Well Dieting vs Exercise for Weight Loss Comments. August 1, 2012. Accessed August 03, 2013. <http://well.blogs.nytimes.com/2012/08/01/dieting-vs-exercise-for-weight-loss/>.

and was no different than that of Westerners after controlling for body size.¹⁸⁸ Hunter gatherers and Western sedentary life have the same caloric requirements. So once again, it is reasonably clear that the role of exercise is not an essential element of weight control let alone a necessity to regulate obesity. Even further, Dr. Timothy Church, the John S. McIlhenny Endowed Chair in Health Wisdom at the Pennington Biomedical Research Center in Louisiana stated “It’s been known for some time that calorie for calorie, it’s easier to lose weight by dieting than by exercise.”¹⁸⁹¹⁹⁰

The \$65 billion diet and fitness industry would fundamentally disagree. The fitness industry wants to maintain their high customer base with the idea that exercise is a primary and exclusive activity necessary for weight loss. The fitness industry currently enjoys annual revenues of \$26 billion.¹⁹¹ Exercise does have a host of positive and measureable benefits. Its legitimate role in weight reduction, however, is more tenuous than actual. In one released study, it was reported that physical activity had increased nationwide, and that activity had still not shown to be strongly related to the decrease of obesity.¹⁹² In yet another study by Trust for America’s Health, if the current trend continues, 2012 may end up being a record year for exercise in the United States.¹⁹³ And

¹⁸⁸ Laura Blue, “Time.” *Time*. Accessed August 16, 2013. <http://healthland.time.com/2012/07/26/modern-lazy-people-burn-as-many-calories-as-hunter-gatherers-so-what-makes-us-fat/>.

¹⁸⁹ Gretchen Reynolds, “Dieting vs. Exercise for Weight Loss.” *Well Dieting vs Exercise for Weight Loss Comments*. August 1, 2012. Accessed August 03, 2013. <http://well.blogs.nytimes.com/2012/08/01/dieting-vs-exercise-for-weight-loss/>.

¹⁹⁰ D.M. Thomas C. Bouchard, T. Church, C. Slentz, W. E. Kraus, L. M. Redman, C. K. Martin, A. M. Silva, M. Vossen, K. Westerterp, and S. B. Heymsfield, Why do individuals not lose more weight from an exercise intervention at a defined dose? An energy balance analysis; National Center for Biotechnology Information. Accessed August 03, 2013. <http://www.ncbi.nlm.nih.gov/pubmed/22681398>. Center for Quantitative Obesity Research, Montclair State University, Montclair, NJ 07043, USA

¹⁹¹ “Gym, Health & Fitness Clubs in the U.S.: Market Research Report,” Accessed August 03, 2013. <http://www.ibisworld.com/industry/default.aspx?indid=1655>.

¹⁹² L. Dwyer-Lindgren, G.D. Freedman, R.E. Engell, T.R. Fleming, S.S. Lim, C.J.L. Murray, and A.H. Mokdad, Prevalence of physical activity and obesity in U.S. counties, 2001–2011: a road map for action. *Population Health Metrics*. 2013; 11:7.

¹⁹³ “Americans Exercising Slightly More in 2012,” Accessed August 03, 2013. <http://www.gallup.com/poll/157505/americans-exercising-slightly-2012.aspx>.

yet, obesity still is trending to make one of every two Americans obese by 2030.¹⁹⁴ So, the question that must be asked is how can we continue to be getting fatter and exercising more? Clearly the prescribed methodology for mitigating weight gain may be more than exercise.

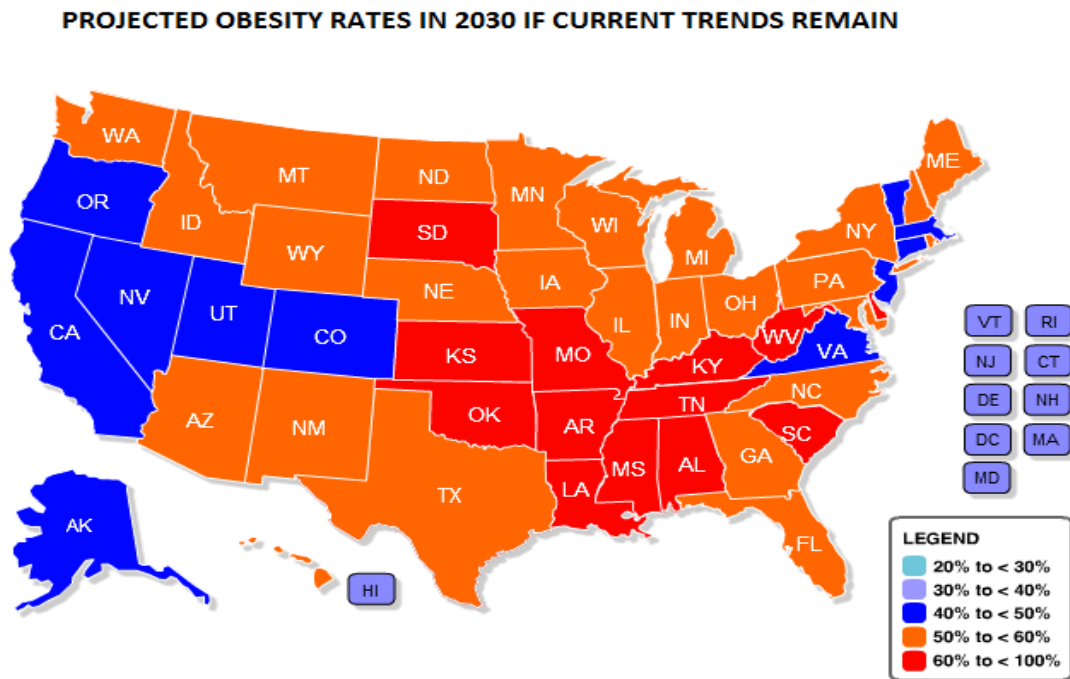


Figure 5. Projected Obesity rates in 2030. Provided by Trust for America's Health

Succinctly stated, exercise is increasing and obesity is increasing.¹⁹⁵ If the energy expenditure theory is true, this increase in obesity should not be happening. One should consider that the energy balance hypothesis at the very least is demonstrating critical inconsistency as a mechanism for controlling obesity.

¹⁹⁴ Michael Strobe, "Group: More than Half in 39 States Will Be Obese." Trust for America's Health. September 18, 2012. Accessed August 03, 2013. <http://healthyamericans.org/newsroom/news/?newsid=2479>.

¹⁹⁵ L. Dwyer-Lindgren, G.D. Freedman, R. E Engell, T.R. Fleming, S. S.Lim , C. J. L. Murray, and A. H. Mokdad, Prevalence of physical activity and obesity in U.S. counties, 2001–2011: a road map for action. *Population Health Metrics*. 2013; 11:7.

There now appears to be a convergence of both apolitical and amoral vortices between innovative science, application, politics, and medicine. The combination of disruptive innovations in the food industry created an apparent abundance of food, and politics radically changed the American diet, and therefore, the American. Carbohydrate and refined food make up the bulk of the American diet. Dietary fat, demonized as the culprit for obesity and cardiovascular disease has been greatly reduced. Yet, we are still growing obese.

The question one must ask is this; if all calories are equal, and their source irrelevant, then all who eat roughly the same amount of calories should have the same amount of obesity.

The United States, Austria, France, and South Korea consume roughly the same amount of calories per day.¹⁹⁶ If that is the case, why does Austria have an 11% population obesity rate, France 11% (it has doubled in the last ten years), South Korea a 3% population obesity rate and the United States a 32% population obesity rate?

If a calorie is a calorie, then all things being equal, the incidence should be the same. The Austrians, the French, and the South Koreans¹⁹⁷ eat a diet with more fat and protein with fewer carbohydrates. Their diets are almost a polar opposite of the American or Standardized Western Industrial diet, and their obesity rate is significantly less. The carbohydrate increase must be considered as a legitimate cause for the obesity gain.

There is also the evidence provided by the Tokelau Island Study.¹⁹⁸ This monitored population consumed a diet that was almost 90% fat, derived from coconut and fish with none of the reported western diseases. Once they transitioned to the Standardized Western Industrial diet, obesity, diabetes, and other chronic diseases

¹⁹⁶ "Daily Calorie Intake Per Capita." Charts Bin. Accessed August 03, 2013.
<http://chartsbin.com/view/1150>. United States and France roughly equivalent in daily consumption

¹⁹⁷ Shin, Nah-Mee, "Obesity in South Korea." Korea University, College of Nursing.
http://www.u21health.org/sites/u21health.org/files/27_0.pdf.

¹⁹⁸ Ian A. Prior, MD, FR CP, FRA, C.P., Flora Davidson, B. H. Sc., Clare E. Salmond, M. Sc., and Z. Czochanska, DIP. AG, Cholesterol, coconuts, and diet on Polynesian atolls: a natural experiment: the Pukapuka and Tokelau island studies. *Am J Clin Nutr* 1981 34: 8 1552–61

proliferated. How does one dismiss what appears to be strikingly obvious? And there is also the Nauru.

Prior to the Nauruans gaining independence in 1968, there was a culture of fishing and gardening. The then Nauruan diet was composed of marine fish, a variety of roots and vegetables and coconut.¹⁹⁹ A country rich in natural resources, the Nauruans began to mine and had a significant increase in revenue. This revenue spike changed the food they ate. According to a study conducted by the Government of Nauru and the World Health Organization (WHO), import of western food significantly reduced the existing culture of fishing and gardening, creating the worst health conditions in the Pacific region.²⁰⁰

These innovators and policy makers had no means to understand the impact of their decisions. In each instance from Faber through Hegsted and Mottern, there was no malice or malfeasance. There was however, decisions made that were capitalized on by industry and combined with critical shifts in policy changed what Americans ate. While there were dissenting voices along the way, it is clear that something very significant changed in the late 1970s and early 1980s. The American diet changed. The commoditization and industrialization of our food industry created food that was carbohydrate dense and nutritionally sparse. Through a series of policy decisions, business decisions, and erroneous science, we have reduced food into a host of components, pieces, and particles. Food is no longer food but referred to as nutrition. This is where the idea of reductionism and nutritionism emerges.

¹⁹⁹ AJW by The Asahi Shimbun, Accessed July 23, 2013.
<http://ajw.asahi.com/article/globe/feature/obesity/AJ201205270051>.

²⁰⁰ Michael Curtis, "The Obesity Epidemic in the Pacific Islands," *Journal of Development and Social transformation*. doi:<http://www.maxwell.syr.edu/uploadedFiles/moynihan/dst/curtis5.pdf>.

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VI. THE FOOD INDUSTRY

A. PART I—REDUCTIONISM

Americans have always been concerned with nutrition.²⁰¹ In 1912, Casimir Funk discovered minerals or certain compounds he would later call vitamins. At approximately the same time, Dr. McCollum and Marguerite Davis discovered a substance in cow's milk, butter fat, and egg yolk that seemed to be essential for growth in laboratory animals.²⁰² Their discovery was called Vitamin A, the first vitamin to be discovered. Additional vitamins were discovered and elimination of deficiency diseases now became possible through the consumption of vitamin rich foods. Even our bread had to be enriched.

Readying for World War II, Selective Service Director, General Lewis B. Hershey reported that draft boards turned away 380,000 of the first million men screened, with malnutrition directly or indirectly causing at least one-third of all rejections.²⁰³ Through war and scientific study, it was determined that as a matter of policy synthetic enrichment, the mandatory inclusion of thiamin, niacin, iron, and, later, riboflavin to flour and bread was necessary to ready, strengthen and prepare America's fighting men. For war planners, synthetic enrichment was the only "realistic" way to improve the nation's health.²⁰⁴ This is our dive into the theme of nutritionist reductionism.

Reductionism is a philosophical position that holds that a complex system is nothing more than the sum of its parts, and that an account of it can be reduced to accounts of individual constituents. This position can be said of objects, phenomena, explanation, theories, and in this particular research, food. Fragmentalism is an alternative term for reductionism. The idea that each substrate or individual component of

²⁰¹ "History of Nutrition Education - An Examination from Vegetarian Perspective," Accessed September 03, 2013. http://www.jivdaya.org/history_of_nutrition_education.html.

²⁰² Ibid.

²⁰³ Aaron Bobrow Strain, "Atomic Bread Baking at Home." *The Believer*. February 2012. Accessed September 03, 2013. http://www.believmag.com/issues/201202/?read=article_bobrow-strain.

²⁰⁴ Ibid.

an object can be deconstructed and then rendered reassembled is demonstrative of the reductionist theory. This reductionist theory is our food system. From the excesses of the overabundance of wheat, corn, soybean, and cotton came a cornucopia of reductionist food ideology that directly impacts the human body.

Reductionism also strongly reflects a certain perspective on causality. In the reductionist framework, phenomena that can be explained completely in terms of relations between other more fundamental phenomena are called epiphenomena. This is the idea or hypothesis that the nutrient components alone, and not its aggregate, benefit health and wellness. This is the consumption of Vitamin C for health instead of eating the orange idea.

There is an implication that the epiphenomenon exerts no causal agency on the fundamental phenomena that explains it. In that light, one can make the case that the progression of the industrial food system we are currently utilizing to feed the Nation is based on the idea that food, even though highly complex, is an organic compound, and a matrix of symbiosis can be deconstructed into its constituent chemicals and then reassembled as desired and required.

What is not taken into account, however, is the disposition that food is an organism that is grown, whether animal or vegetable, and maintains a symbiosis of relationships with each constituent part of the organism and to deconstruct it is akin to reducing the human body to its chemical compositions and having the idea that it can be reconstituted into a previous or more improved reconstruction.

This reductionist theory, as it is related to food has a term—nutritionism.²⁰⁵ Nutritionism is a purported paradigm or idea that makes the assumption that all identified nutrients can be deconstructed and has a minimum intrinsic value assigned. In this disaggregated state, the nutrients have a different value than the collective combination of

²⁰⁵ Gyorgy Scrinis. *Nutritionism: The Science and Politics of Dietary Advice*. New York: Columbia University Press, 2013.

those nutrients, as well as their relationships as they occur in nature.²⁰⁶ Gyorgy Scrinis' coined the phrase and Michael Pollan popularized it in his book In Defense of Food.

Our industrial food system no longer produces food but reconstituted food products, emphasizing the macronutrients of fat, carbohydrates, and proteins and the micro nutrients of phyto chemicals, nutrients, antioxidants et cetera. This nutritionism is the unintended consequence of profit margin and maximizing profit yields, growth yields, and economies of scale.

Scrinis and Pollan postulate that the refined or industrial food system makes the argument that the nutritional value of a food is the sum of all its individual nutrients, vitamins, and other components. This is the bridge to the nutritionism argument and the reductionist point of view on food. Pollan is often quoted in lectures and talks that we no longer discuss food being simply food but as nutrients, chemicals, vitamins, protein, anti-oxidants, and in a variety of other contexts. This theology of food or new religion called nutritionism has become the justification to disaggregate food into components and reassemble it in variety of other products. This, therefore, is no longer food but “food-like substance,” highly processed foodstuff, or simply “nutrition.”

Dr. T. Colin Campbell spends a great deal of time discussing it in his recent book, Whole: Rethinking the Science of Nutrition. The book discusses the state of food and makes a clear distinction between “wholism” and “reductionism.” Campbell differentiates early on and often: “If you are a reductionist, you believe that everything in the world can be understood if you understand all its component parts. A wholist, on the other hand, believes that the whole can be greater than the sum of its parts. That’s it: the entire debate in a nutshell.”²⁰⁷

Campbell postulates that this practice has roots in an ideological clash between faith and rationalist viewpoints. These two dispositions became more and more diametrically opposed resulting in an antagonism: “Rather than seeking partnerships with

²⁰⁶ Gyorgy Scrinis, *Nutritionism: The Science and Politics of Dietary Advice*. New York: Columbia University Press, 2013.

²⁰⁷ T. Colin Campbell, and Howard Jacobson, *Whole: Rethinking the Science of Nutrition*. 1st ed. Dallas, Texas: BenBella Books, 2013. 49.

theologians, scientists increasingly sought to distance themselves and their endeavors from “superstitions” not grounded in observable fact. This included not just religion, but any idea that did not adhere to scientific views, in which truth was found only through breaking down the observable world into as many smaller parts as possible. In short: reductionism.”²⁰⁸

This is what the food industry thrives on; the idea that food requires disaggregation, disassembly, reassembly, a litany of experts, and to a certain degree the movement from eating whole food and instead eating nutrients and merely a thrown together conglomeration of parts. It is the quintessence of maximizing utility. There are profound limitations inherent to any discussion or research about nutrition where the focus is on nutrient composition or individual foods or food groups. Foods in their original form contain a mix of different nutrients that exist in a symbiosis of balance. Nutrients that, when disaggregated, would appear to contraindicate with other nutrients. These nutrients as a complex adaptive organism (something grown) performs differently than when disaggregated.

For example, a simple soybean, ear of corn, or stalk of wheat are all different and contains hundreds, if not thousands, of synergistic bioactive compounds, including but not limited to sugars, starch, fiber, mono-unsaturated fatty acids, poly-unsaturated fatty acids, protein, magnesium, potassium, phosphorous, calcium, manganese, Vitamin C, isoflavones, and possibly pesticides. Now these same plants with their genes modified through intervention and chemistry are disaggregated into simply components of soybean, corn, and wheat. This new product, while still technically soybean, corn, and wheat is typically eaten in the context of additives in several other foods in a meal, which are eaten in the context of numerous other foods over the course of a day. These disaggregated components appear in nearly every refined food product we eat...everyone.

²⁰⁸ T. Colin Campbell, and Howard Jacobson, *Whole: Rethinking the Science of Nutrition*. 1st ed. Dallas, Texas: BenBella Books, 2013. 53.

So too, selecting soybeans as a food carries a whole range of symbolic and other meanings. When we study and report on nutrition primarily from the perspective of specific nutrients, or even particular foods, or growing methods, it is inevitable that the bigger picture disappears. Not only do we lose the larger context of interactions between nutrients, for example, we also risk losing view of structural variables and lifestyle habits that affect metabolism and well-being, such as oppression, exercise, stress, or our attitudes towards food.

In a *New York Times* article Michael Pollan goes further still; we are worried far too much about nutrients than just food. By utilizing the components of the disaggregated food and reconstituting them into “product,” the food industry can maximize economies of scale and change the dialogue from food distribution to nutrient delivery. Here is an example of reducing food into its components.²⁰⁹

Pollan writes;

Indeed, to look at the chemical composition of any common food plant is to realize just how much complexity lurks within it. Here’s a list of just the antioxidants that have been identified in garden-variety thyme:

Terpineol, alanine, anethole, apigenin, ascorbic acid, beta carotene, caffeic acid, camphene, carvacrol, chlorogenic acid, chrysoeriol, eriodictyol, eugenol, ferulic acid, gallic acid, gamma-terpinene isochlorogenic acid, isoeugenol, isothymonin, kaempferol, labiatic acid, lauric acid, linalyl acetate, luteolin, methionine, myrcene, myristic acid, naringenin, oleanolic acid, p-coumaric acid, p-hydroxy-benzoic acid, palmitic acid, rosmarinic acid, selenium, tannin, thymol, tryptophan, ursolic acid, vanillic acid.²¹⁰

That is a lot of “nutrition,” but it is merely the herb thyme.

²⁰⁹ Michael Pollan, “Unhappy Meals.” *The New York Times*, January 28, 2007. Accessed September 03, 2013. <http://www.nytimes.com/2007/01/28/magazine/28nutritionism.t.html?pagewanted=all>.

²¹⁰ Ibid.

Pollan continues;

This is what you're ingesting when you eat food flavored with thyme. Some of these chemicals are broken down by your digestion, but others are going on to do undetermined things to your body: turning some gene's expression on or off, perhaps, or heading off a free radical before it disturbs a strand of DNA deep in some cell. It would be great to know how this all works, but in the meantime we can enjoy thyme in the knowledge that it probably doesn't do any harm (since people have been eating it forever) and that it may actually do some good and that even if it does nothing, we like the way it tastes.

The philosophical approach to knowledge that strives to study factors in their "pure" state, free of relationship to other variables has a name: scientific reductionism.

Here is another; the nutrient breakout of chocolate. It used to simply be food. Now it is a litany of nutrient speak and chemical compounds. It is conjured as a medicine, a supplement, and an aphrodisiac. It is the world's greatest source of anti-oxidants. It is a super food.²¹¹ It is so many things. One needs to simply read, listen, or watch a variety of articles, books, documentaries, and audio books or podcasts to grasp the degree of nutritionism and molecular efficacy we are pitched every day and in many forms.

The following pages list the approximately 170 phytochemicals in Cacao or the chemistry of chocolate.²¹²

²¹¹ Jennifer Warner, "Is Chocolate the Next Super Food?" WebMD. February 7, 2011. Accessed September 03, 2013. <http://www.webmd.com/food-recipes/news/20110207/is-chocolate-the-next-super-food>.

²¹² "All about Chocolate – Science," Accessed September 03, 2013. <http://www.xocoatl.org/science.htm>.

(-)-epicatechin
 3-alpha-l-arabinosidyl-cyanidin
 3-beta-d-galactosidyl-cyanidin
 4-hydroxy-3-methoxybenzoic-acid
 24-methylenecycloartanol

Acetic-acid	Aesculetin	Alanine	Alkaloids	Alpha-sitosterol	
Alpha-theosterol	Amyl-acetate	Amyl-alcohol	Amyl-butyrate	Amylase	
Apigenin-7-o-glucoside	Arabinose	Arachidic-acid	Arginine	Ascorbic-acid	Ascorbic-acid-oxidase
	Aspariginase				
Beta-carotene	Beta-sitosterol	Beta-theosterol	Biotin		
Caffeic-acid	Caffeine	Calcium	Campesterol	Catalase	
Catechins	Catechol	Cellulase	Cellulose	Chlorogenic-acid	
Chrysoeriol-7-o-glucoside	Citric-acid	Coumarin	Cyanidin	Cyanidin-3-beta-l-arabinoside	
Cyanidin-3-galactoside	Cyanidin-glycoside	Cycloartanol			
D-galactose	Decarboxylase	Dextrinase	Diacetyl	Dopamine	
Epigallocatechin	Ergosterol				
Ferulic-acid	Formic-acid	Fructose	Furfurol		
Galacturonic-acid	Gallocatechin	Gentisic-acid	Glucose	Glutamic-acid	Glycerin
	Glycine	Glycolic-acid	Glycosidase		Glycerophosphatase
Haematin	Histidine				
I-butyric-acid	Idaein	Invertase	Isobutylacetate	Isoleucine	Isopropyl-acetate
Isovitexin					
Kaempferol ²¹³					

²¹³ Ibid.

L-epicatechin Luteolin	Leucine Luteolin-7-o-glucoside	Leucocyanidins Lysine	Linalool Lysophosphatidyl-choline	Linoleic-acid	Lipase	
Maleic-acid Methylheptenone	Mannan	Manninotriose	Mannose	Melibiose	Mesoinositol	
N-butylacetate	N-nonacosane	Niacin	Nicotinamide	Nicotinic acid	Nitrogen	Nonanoic-acid
O-hydroxyphenylacetic-acid	Octoic-acid	Oleic acid	Oleo-dipalmitin	Oleopalmitostearin		Oxalic-acid
P-anisic-acid Palmitodiolen Phenylalanine Phosphorus Proline Propionic-acid	P-coumaric acid Pantothenic-acid Phlobaphene Phytase Propyl-acetate	P-coumarylquinic-acid Pectin Phosphatidyl-choline Planteose Protocatechuic-acid	P-hydroxybenzoic-acid Pentose Phosphatidyl ethanolamine Polygalacturonate Purine	P-hydroxyphenylacetic-acid Peroxidase Phosphatidyl-inositol Polyphenol-oxidase Pyridoxine		Palmitic-acid Phenylacetic-acid Phospholipids Polyphenols
Quercetin	Quercetin-3-o-galactoside		Quercetin-3-o-glucoside	Quercitrin		
Raffinase	Raffinose	Reductase	Rhamnose	Riboflavin	Rutin Rutoside	
Saccharose Stearodiolein	Salsolinol Stigmasterol	Serine Sucrose	Sinapic-acid Syringic-acid	Stachyose	Stearic-acid	
Tannins Trigonelline	Tartaric-acid Tyramine	Theobromine Tyrosine	Theophylline	Thiamin	Threonine	
Valerianic-acid	Valine	Vanillic-acid	Verbascose	Verbascotetrose	Vitexin ²¹⁴	

²¹⁴ Ibid.

Cacao used simply to be a food that was eaten and savored. Now, chocolate and all its derivatives have been repurposed as a chemical cocktail, health food, nutrient, antioxidant, aphrodisiac, and many other purposed and repurposed nutritional extracts. Clearly, this is the rationale to deconstruct foods into their substrates.²¹⁵ Perhaps this is the direction all human inputs will take.²¹⁶ If so, the nutritionism will only become more complex, forever changing the culture and social interface and communal activity we have shared and enjoyed for millennia.

We are bombarded with this nutritionism and reductionist thinking every day. Therefore, our desire for nutrition, micronutrients, and chemical contraindications overtakes the desire for simple, whole food. Food is no longer marketed as simply food but a variety of product designed to meet the growing illusion of ills and nutritional shortcomings. Most of our food products are not food at all but low fat, no cholesterol, whole grain, heart healthy grain, omega 3 rich, vitamin fortified, chemically enhanced nutritionally sparse product. It is not food.

B. PART II—THE FOOD INDUSTRY

Our Industrialized food system; is it our success that is making us sick?

One of any nation's hallmarks for security and resilience is the ability to feed itself. Perhaps what we eat is more important than the quantities. Is our food and its production making us obese? The idea that our food and how it is produced as being the primary, if not sole reason, for the increase in metabolic syndrome, insulin sensitivity, and obesity has very few advocates but quite a bit of evidence.²¹⁷ This idea would significantly damage the idea that obesity is solely the fault or character flaw of the

²¹⁵ "All about Chocolate – Science," Accessed September 03, 2013. <http://www.xocoatl.org/science.htm>.

²¹⁶ Paula Forbes, "Watch Bill Yosses Explain Molecular Pastry at Harvard." Eater National. December 5, 2011. Accessed September 03, 2013. <http://eater.com/archives/2011/12/05/watch-bill-yosses-explain-molecular-pastry-at-harvard.php>.

²¹⁷ "Metabolic Syndrome," Metabolic Syndrome. February 06, 2012. Accessed August 03, 2013. Board, A.D.A.M. Editorial <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0004546/>.

obese. What about young children? What about members in the military? What about 75% of recruitment age Americans?²¹⁸

It is big, big business to maintain our current food system. It is a multi-trillion dollar business. Meaning, it is not in the best interests of the food industry, the diet industry, the fitness industry, the supplemental industry, and pharmacological industry, if Americans were able to reverse the trend of obesity. The idea that dieting does not work, supplements do not work, and the eat less and exercise more theory does not work would be an indictment of Congress, their lobbyists, and the food industry they advocate for.

One must simply follow the money. According to the Media Awareness Network, “It is estimated that the diet industry alone generates revenues in excess of \$100 billion (U.S.) a year. And if the aforementioned regimens were successful in reducing obesity, why is it increasing year after year?

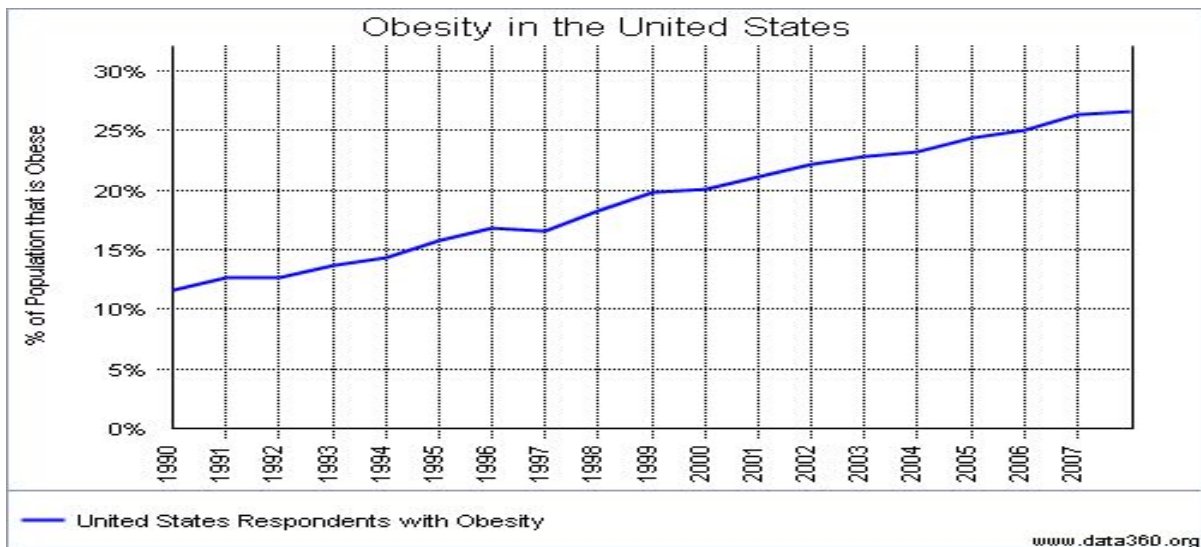


Figure 6. The United States increase in obesity. Provided by Data360.org

²¹⁸ William McMicheal, “Most U.S. Youths Unfit to Serve, Data Show.” Army Times, November 3, 2009. Accessed August 03, 2013.
http://www.armytimes.com/news/2009/11/military_unfityouths_recruiting_110309w/.

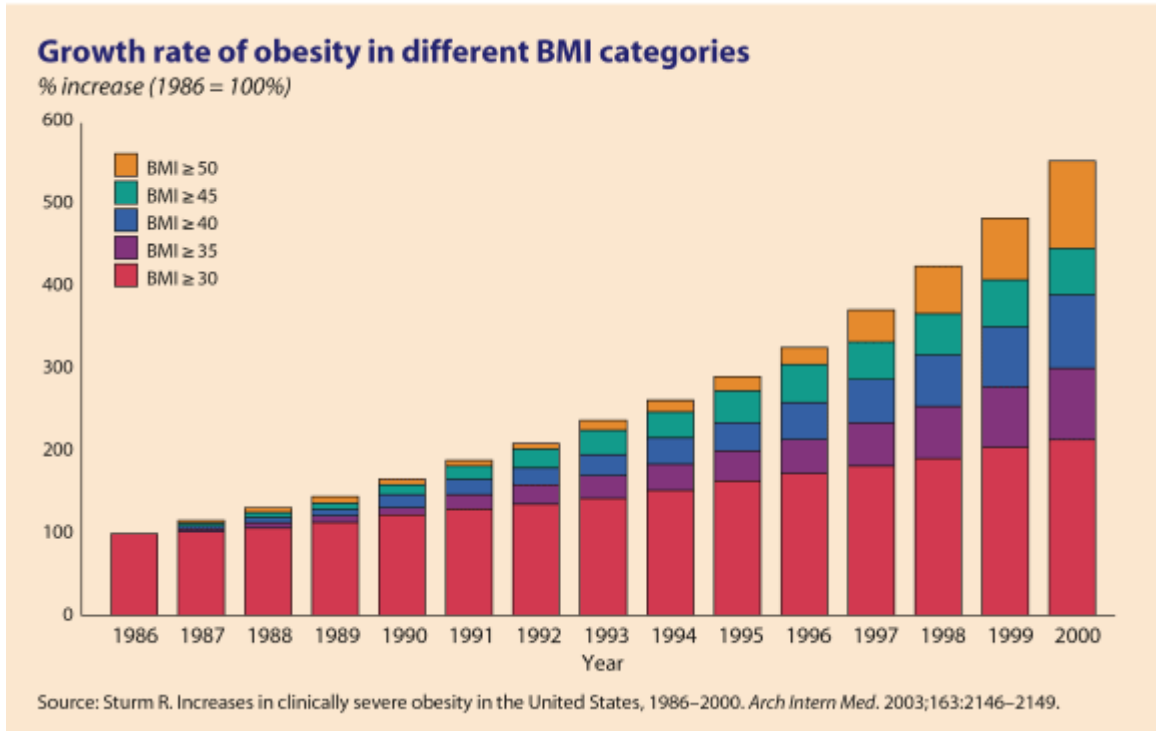


Figure 7. The growing rate of obesity in different BMI categories. Provided by Archives of Internal Medicine, 2003

According to the Center for Disease Control (CDC), in 1985, the Nations' obesity levels looked like this;

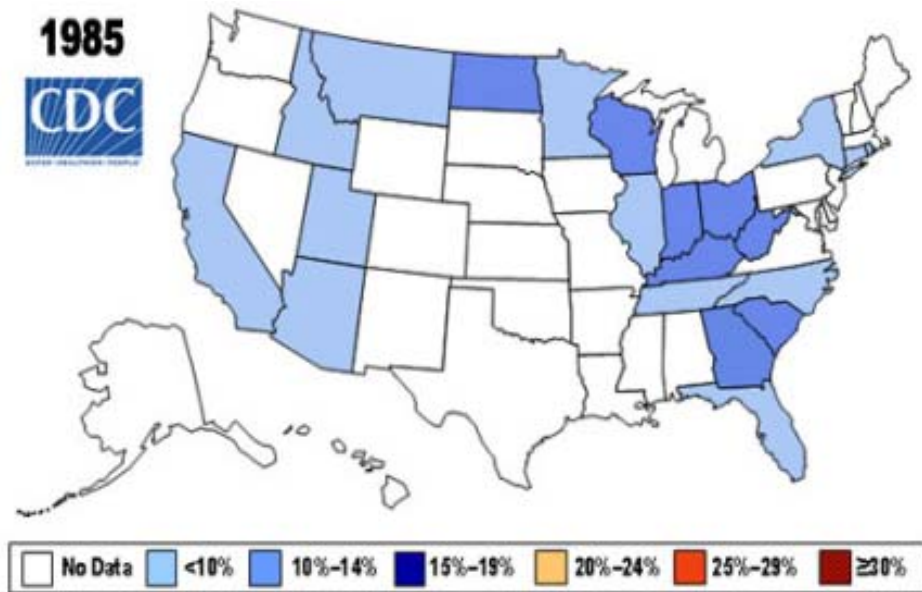


Figure 8. The CDC Obesity levels in 1985. Provided by the CDC.

In 2010, the CDC said the obesity levels looked like this:

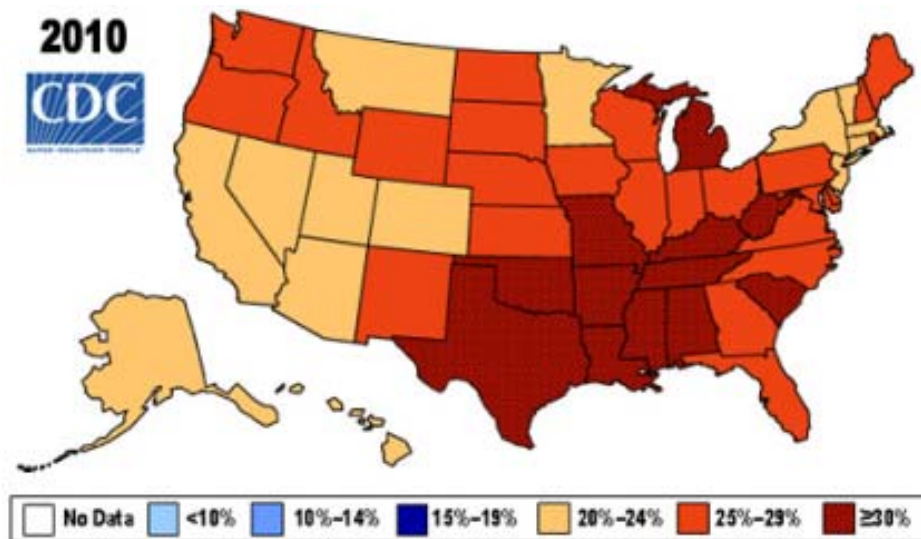


Figure 9. The CDC Obesity levels in 2010. Provided by the CDC

And in yet another provocative graphic, as our calories and percentage of consumption of dietary fat has decreased, our levels of obesity have increased.



Figure 10. Prevalence of Obesity Compared to Percent Calories from Fat Among U.S. Adults. Screen shot provided by a Dr. Robert Lustig lecture

As one can see, the calories from consumed dietary fat have steadily decreased and obesity has increased.^{219,220} And one can also see a change in obesity prevalence beginning in the late 1970s, early 1980s. This coincides with the transition to a 65% diet of carbohydrates and reduction of dietary fat.

The multitrillion dollar industry needs the obesity paradigm not to change. Their product development, marketing, advertising, and transformation mantra is not nearly as transformational as it is false advertising. This could be a reason. The fast food industry spent more than \$4.2 billion in 2009 on TV advertising, radio, magazines, outdoor

²¹⁹ Robert Lustig, "Sugar; The Bitter Truth." Lecture, Sugar, the Bitter Truth, UCSD, San Diego, California, July 27, 2009.<http://www.ucsd.tv/search-details.aspx?showID=16717>

²²⁰ Ibid.

advertising, and other media.²²¹ Contrast that with the \$6.5 million the Center for Nutrition Policy and Promotion spends to improve the health and well-being of Americans by developing and promoting dietary guidance that links scientific research to the nutrition needs of consumers.²²² The mere attempt is a losing proposition.

Evidence that soda and flavored soft drinks make Americans who drink them fat becomes more available each day. The consumption of High Fructose Corn Syrup (HFCS) increased 1000% between 1970 and 1990, far exceeding the changes in intake of any other food or food group.²²³ HFCS now represents 40% of caloric sweeteners added to foods and beverages and is the sole caloric sweetener in soft drinks in the United States.²²⁴ Sugar sweetened soft drinks contribute in excess of 7%, the total energy intake, and represent the largest single food source of calories in the standard American diet.²²⁵ Sugary drinks contribute 22% of empty calories consumed by children and teens, and soda is the number-one source of calories in teens' diets.²²⁶

The increased use of HFCS in the United States mirrors the rapid increase in obesity.²²⁷

²²¹ Kelly D. Brownell, PhD, Marlene B. Schwartz, PhD, and Jennifer L. Harris, PhD, MBA, "Evaluating Fast Food Nutrition and Marketing to Youth." Fastfood Marketing.org. Accessed August 3, 2013. http://www.fastfoodmarketing.org/media/FastFoodFACTS_Report_Summary.pdf.

²²² Michael Moss, "While Warning About Fat, U.S. Pushes Cheese Sales." NY TIMES. Accessed 2010. http://www.nytimes.com/2010/11/07/us/07fat.html?_r=3&hp=&pagewanted=all&.

²²³ George A. Bray, S. J. Nielsen, and B.M. Popkin, "Consumption of High-fructose Corn Syrup in Beverages May Play a Role in the Epidemic of Obesity." *American Journal of Clinical Nutrition* 79, no. 4 (April 2004): 537–43.

²²⁴ Ibid.

²²⁵ Block G. Foods contributing to energy intake in the U.S.: data from NHANES III and NHANES 1999–2000. *J Food Compos Anal.* 2004;17: 439–447.

²²⁶ J. Reedy, and S. M. Krebs-Smith, (2010). Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *Journal of the American Dietetic Association*, 110(10), 1477–1484.

²²⁷ George A. Bray, Samara Joy Nielsen, and Barry M. Popkin, Consumption of high-fructose corn syrup in beverages may play a role in the epidemic of obesity. *Am J Clin Nutr.* 2004; 79: 537–543.

There have also been multiple studies that have found an association between sugar sweetened drinks and increased incidence of child obesity.^{228 229} In one particularly damning study, the likelihood of obesity increased 1.6 times for every additional sugar drink consumed every day.²³⁰

The digestion, absorption, and metabolism of fructose differ from those of glucose. Hepatic metabolism of fructose favors “de novo lipogenesis,” or better known as converting dietary carbohydrate (CHO) into fat.²³¹ Sugar is converted to fat. Glucose, the fuel of cells, transits the body through the blood stream and is stored as glycogen in the muscles and liver. Every cell in the body can utilize glucose for energy. In contrast, when fructose is ingested, it bypasses regular digestion and is shunted directly to the liver.

Liver cells are one of the few types of cells that can convert fructose to energy, thereby rendering the liver as the exclusive metabolic organ. The liver accomplishes this primarily by turning fructose into glucose and lactate. Eating exceptionally large amounts of fructose burdens and scars the liver: it spends so much energy turning fructose into other molecules that it may not have much energy left for all its other functions. A consequence of this energy depletion is production of triglycerides, fatty liver (cirrhosis) uric acid, which research has linked to gout, kidney stones and high blood pressure.²³²

In addition, unlike glucose, fructose does not stimulate insulin secretion or enhance leptin production. Because insulin and leptin act as key afferent signals in the regulation of food intake and body weight, this suggests that dietary fructose may

²²⁸ David S Ludwig MD, Karen E Peterson ScD, and Steven L Gortmaker PhD, Relation between consumption of sugar--sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet*.2001; 357: 505–508.consumption in 6- to 13-year-old children. *J Pediatr*. 2003;142:604610.

²²⁹ Gordana Mrdjenovic, and David A. Levitsky, Nutritional and energetic consequences of sweetened drink consumption in 6- to 13-year-old children. *J Pediatr*. 2003; 142:604610.

²³⁰ Matthias B. Schulze; JoAnn E. Manson; David S. Ludwig; et al. Sugar-sweetened beverages, weight gain, and incidence of type 2 diabetes in young and middle-aged women. *JAMA*. 2004; 292(8):927–934 (doi:10.1001/jama.292.8.927).

²³¹ Marc K. Hellerstein, No common energy currency: de novo lipogenesis as the road less traveled *Am J Clin Nutr* 2001 74: 6 707–708.

²³² Ferris Jabr, “Is Sugar Really Toxic? Sifting through the Evidence.” *Scientific American*. July 15, 2013. Accessed August 03, 2013. <http://blogs.scientificamerican.com/brainwaves/2013/07/15/is-sugar-really-toxic-sifting-through-the-evidence/>.

contribute to increased energy intake and weight gain. Furthermore, calorically sweetened beverages may enhance caloric overconsumption. It would appear that soda and drinks sweetened with either sucrose or HFCS are associated with an exponential rise in obesity and Type 2 Diabetes.

The soft drink industry anticipates almost \$310 billion in revenue by 2015.²³³ So in terms of economics, it is not in the best interest of the soft drink industry to have it proven that soda makes Americans fat. Researchers from the University of Virginia in Charlottesville surveyed the parents of 9,600 children born in 2001 from across the nation, asking questions about their TV-watching habits, socioeconomic level, and children's consumption of sugary drinks. The completed study, published in this month's issue of the journal *Pediatrics*, reported that five-year-old children who drank beverages sweetened by sugar every day were 43% more likely to be obese than those who drank the beverages less frequently, or not at all.²³⁴ And it is not simply fast food, and soft drinks.

Our commoditization of food is the primary input for inexpensive drinks and inexpensive food. Clearly, the relationship between health, obesity, and national and homeland security has been breached. There is ample evidence to support the idea that our consumption of particular substrates has had a deleterious effect on our health and impacted the exponential increase of obesity.

²³³ "Soft Drinks - Global Group of Eight (G8) Industry Guide and Country Profiles," Report Linker.com. Accessed August 03, 2013. <http://www.reportlinker.com/p0139018-summary/Soft-Drinks-Global-Group-of-Eight-G8-Industry-Guide.html>.

The Group of Eight (G8) comprises contributed \$290,866.3 million in 2010 to the global soft drinks industry, with a compound annual growth rate (CAGR) of 1.3% between 2006 and 2010. The G8 countries are expected to reach a value of \$309,283.5 million in 2015, with a CAGR of 1.2% over the 2010–15 period. Among the G8 countries, the U.S. holds the major share of the soft drinks industry. It accounted for a share of 42.9% in 2010. Among the G8 nations, U.S. is the leading country in the soft drinks industry, with market revenues of \$124,739.8 million in 2010.

²³⁴ Mark D. DeBoer, Rebecca J. Scharf, and Ryan T. Demmer, Sugar-Sweetened Beverages and Weight Gain in 2- to 5-Year-Old Children *Pediatrics* peds.2013–0570; published ahead of print August 5, 2013, doi:10.1542/peds.2013–0570.

1. The Farm Bill

Today, the Farm Bill's (The Agriculture Reform, Food, and Jobs Act of 2013) price tag is expected to eclipse \$1 trillion.²³⁵ The Farm Bill programs provide large revenue streams to farm businesses growing five main crops, including corn, soybeans, wheat, cotton, and rice. The Farm Bill, American citizens' tax revenues, are being converted into government subsidized obesity.

Since farm subsidy and crop insurance programs were originally written to satisfy a few special interests, it is no surprise that 90% of these subsidies go to growers of only five main crops.²³⁶ And, according to the Environmental Working Group (EWG), between 1995 and 2010, a mere 10% of American farmers collected 74% of all subsidies, amounting to nearly \$166 billion over 16 years.²³⁷

A food system built on sugars (carbohydrates) (derived from corn) added fats that act as an inflammatory agent (derived mainly from soy) and a host of fillers (from wheat) will be calorically dense, nutritionally sparse, and inexpensive to cultivate.

In addition, included in the bill is The Supplemental Nutrition Assistance Program (or SNAP, formerly known as food stamps) had expenditures of \$72–78 billion in 2011, up from \$30 billion just four years earlier.²³⁸ Participation in the program was the highest in record and appears to be growing. Participation in this program drives one in seven Americans into food stores for low cost, highly processed food.²³⁹ And those products

²³⁵ "Farm Bill 101," Taxpayers for Common Sense. October 2, 2010. Accessed August 03, 2013. <http://www.taxpayer.net/library/article/farm-bill-101>.

²³⁶ "Congressional Budget Office," CBO. April 19, 2012. Accessed August 03, 2013. <http://www.cbo.gov/publication/43175>.

²³⁷ "The United States Summary Information," EWG Farm Subsidy Database. Accessed August 03, 2013. <http://farm.ewg.org/region.php?fips=00000>.

²³⁸ "An Overview of the Supplemental Nutrition Assistance Program," CBO. April 19, 2012. Accessed August 03, 2013. <http://www.cbo.gov/publication/43175>.

²³⁹ "Food Stamp Use Linked To Weight Gain, Study Finds," Science Daily. August 12, 2009. Accessed August 03, 2013. <http://www.sciencedaily.com/releases/2009/08/090810122139.htm>.

are derived from heavily subsidized, government protected, lobbyist enhanced food companies.²⁴⁰

Rising rates of obesity in the United States have been linked to food supply trends and to the growing consumption of energy-dense foods and the increased consumption of snacks has been shown repeatedly to be associated with obesity and excess weight gain.²⁴¹ These foods are universally high in sugar and processed commodities.

It is the prevalence, volume, and ubiquity that these crops and their industrialized production are the primary reasons we are continuing to grow obese. These systems are so rigid and tightly coupled that what appears to exist is a complex system of monocultures. This “mono-system” may create as much waste as it does efficiency. What is also troubling with the increase in obesity is the amount of waste with regard to production.

2. Obesity Increases While Food Is Wasted

It is estimated that upwards of 50% of all food produced is wasted.²⁴² Timothy Jones, an anthropologist at the University of Arizona’s Bureau of Applied Research has spent ten years studying our rates of production, consumption, and discarded food. He found that nearly 50% of all produced food is not only wasted, but never even harvested.²⁴³ He believes we are wasting billions of dollars annually, as well as creating both an environmental and national security issue with this behavior.²⁴⁴

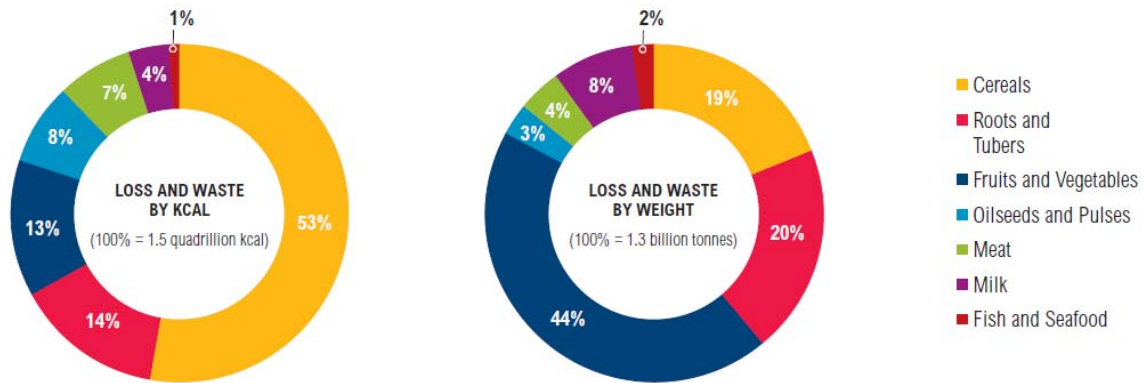
²⁴⁰ Alan Farnam, “Food Stamps: Fat Times For Food Companies, Recipients in \$72B Program.” ABC News. September 07, 2012. Accessed August 03, 2013. <http://abcnews.go.com/Business/food-stamps-making-food-companies-fat/story?id=17166643>.

²⁴¹ Adam Drewnowski, and S. E. Specter, “Poverty and Obesity: The Role of Energy Density and Energy Costs.” *Childrens Healthwatch*. January 16, 2008. http://www.childrenshealthwatch.org/upload/resource/drenowski_povertyobesity_2004.pdf. Reprinted from *Am J Clin Nutr* 2004;79:6 –16. Printed in USA. © 2004 American Society for Clinical Nutrition.

²⁴² Rebecca Smithers, “Almost Half of the World’s Food Thrown Away, Report Finds.” *The Guardian*. October 01, 2013. Accessed August 03, 2013. <http://www.guardian.co.uk/environment/2013/jan/10/half-world-food-waste>.

²⁴³ Brian Lipinski, Craig Hanson, James Lomax, Lisa Kitinoja, Richard Waite, and Tim Searchinger, 2013. “Reducing Food Loss and Waste.” Working Paper, Installment 2 of Creating a Sustainable Food Future. Washington, DC: World Resources Institute.

²⁴⁴ “Half of U.S. Food Goes to Waste,” *FoodProductionDaily.com*. November 25, 2004. Accessed August 03, 2013. <http://www.foodproductiondaily.com/Supply-Chain/Half-of-U.S.-food-goes-to-waste>.



Source: WRI analysis based on FAO. 2011. *Global food losses and food waste—extent, causes and prevention*. Rome: UN FAO.

Figure 11. Loss and Waste by Calories and Weight. Provided by UNFAO

That would also be compounding all the inputs necessary for a yield that is cut in half by waste; water, animals, antibiotics, electricity, fertilizer, petroleum, refrigerant, et cetera. Their interdependence on each other's rigidity is a recipe for a cascading failure and an inability to adapt.

It also takes energy to make energy, so to speak. A host of petroleum, natural gas, and other fuels are necessary to power the industrial food system. The industrialized food system requires inexpensive and readily available fuel for success. In the United States, it is estimated that a minimum of 400 gallons of oil equivalents are expended annually to feed each American citizen.²⁴⁵ One-third of this equivalent is in fertilizer with another third in machinery and transportation costs. And, if accounting for the effects of the North America Free Trade Agreement (NAFTA), the number only skyrockets. Energy costs for packaging, refrigeration, transportation to retail outlets, and household cooking are not considered in these figures.

To exemplify the amount of the energy intensiveness of modern agriculture, production of one kilogram of nitrogen for fertilizer requires the energy equivalent of from 1.4 to 1.8 liters of diesel fuel. This is not considering the natural gas feedstock.

²⁴⁵ David Pimentel, and M. Giampietro, *Food, Land, Population and the U.S. Economy*. Washington, D.C.: Carrying Capacity Network, 1994.

According to The Fertilizer Institute, the United States used approximately 17,500,000 short tons of nitrogen fertilizer, annually.²⁴⁶ This figure does not take into account the additional short tons of phosphorus and potassium, and nitrogen effectively known as the P, K, N fertilizers.

Using the low figure of 1.4 liters diesel equivalent per kilogram of nitrogen, this equates to the energy content of 15.3 billion liters of diesel fuel, or 96.2 million barrels. And our return on our fuel usage is a cost benefit of 3:1 The John Hopkins Bloomberg School of Public Health estimated that, using our current system, three calories of energy are needed to create one calorie of edible food.²⁴⁷ By adding a latticed decentralized food node development and distribution system, food would have to travel far less and infuse the local economies with revenue created there. It would also destroy the current grow to plate distances.

In contrast to this information, the Center for Consumer Freedom (CCF), a nonprofit organization devoted to promoting personal responsibility and protecting consumer choices, would vociferously advocate that it is a personal responsibility and lack of discipline matter with regard to food and its consumption.²⁴⁸ The CCF makes the argument that there are a growing group of activists who would rather blame the food industry for society's ills in lieu of exercising more personal responsibility and making better choices. What makes the argument of the CCF interesting is the providers of funding. Contributors to CCF have included the Coca-Cola Company, Cargill, Inc., Monsanto, Tyson Foods, and a host of other companies and food industry giants. These companies are able to aptly produce a host of frozen vegetables and fruits that are healthy, nutritious, and relatively inexpensive. But at the same time, they are also the

²⁴⁶ "Fertilizer Use | TFI," Accessed August 03, 2013. <http://www.tfi.org/statistics/fertilizer-use>.

²⁴⁷ "Fossil Fuel and Energy Use," NYU. <https://www.nyu.edu/sustainability/pdf/Fossil%20Fuel%20and%20Energy%20Use%202%20FCSummit-HO-20091207.pdf>. Also available at sustainable table <http://www.sustainabletable.org/>.

²⁴⁸ Center for Consumer Freedom, Center for Consumer Freedom Atom. Accessed August 03, 2013. <http://www.consumerfreedom.com/about/>.

industry that deconstructs milk and then reconstitutes it with lanolin from animal skin and sheared sheep because of a higher amount of Vitamin D.²⁴⁹²⁵⁰

Further still, one can make an argument that the food industry is not culpable at all but simply meeting the desired needs of the consumer and competing in an aggressive battle for market share. Jobs, production, export, and sales are the commodities this food industry produces; not simply food. Hank Cardillo, a former senior food executive and author of STUFFED, an Insider's look who's (really) making America fat and how the food industry can fix it, calls this complex system foodonomics.²⁵¹ Cardillo attempts to demonstrate that the food industry can and should do better in terms of healthier products and are not as culpable as they appear. However, he then demonstrates how a large Coke at McDonalds has a 77% profit margin. (Cardillo, 155) So in that light, the necessity to make large profits appears to be more than simply providing employment and economic opportunities.

While all these industries do compete in a competitive and dynamic fiscal environment, and their shareholders do demand return on their investment, there is reasonable evidence to indicate that the food industry who purports to want it's consumers healthy is in fact acutely aware their products are making us sick and obese. While it appears reasonable to hold customers accountable in terms of behavior, choices, and responsibility, it should also be reasonable to hold the food industry to a similar standard. Unfortunately, the environment makes for a vicious cycle.

Competition within and amongst companies and industries drives many initiatives, the predominant ones are to try and innovate, maintain consumer engagement, and maintain market share. However, within their competitive necessity and zeal, along with their commercial challenges, there appears to be a significant result; all these industries are making incredible annual profits. Their customers who are convinced by

²⁴⁹ Paul Roberts, *The End of Food*. Boston: Houghton Mifflin Company, 2008.

²⁵⁰ Melanie Warner, *Pandora's Lunchbox: How Processed Food Took over the American Meal*. Scribner, 2013. Print.

²⁵¹ Erik Lars Larsen, "Foodonomics." *Foodonomics*. January 31, 2012. Accessed August 03, 2013. <http://foodonomics.blogspot.com/>.

these industries that their product, methodology, research, and point of view are desired may actually be making them less healthy than advertised. What is good for industry may not be good for people. The dark conclusion is it not in industries' best interests for people and the world to get healthy.

However, it does seem borderline unfathomable to make better choices and act responsibly when the food industry spends roughly \$2 billion annually on marketing food directly to children.²⁵² And, it becomes increasingly difficult to withstand the onslaught of the fast food industry alone spending approximately \$5 million every day targeting and marketing to children.²⁵³

The last 35 years has clearly demonstrated that policies and innovation has a magnitude and order of effect that was never identified, expected, nor supposed.

C. PART III—THE FOOD INDUSTRY

1. Physiological Response to Designed Food

We love salt, fat, and sugar, especially combined. How the industrial food system exploits hedonic design to meet those tastes.

We no longer eat food but previously disaggregated food that has been re assembled into a food like product, devoid of any nutritional value, loaded with refined carbohydrates, refined fats, and preservatives that make us sick, fat, and wanting more.

The food industries are by overt design, experts at meeting our needs for contrast and avoiding sensory specific satiety.²⁵⁴ Subverting “sensory-specific satiety” is the key to junk-food success. This sensory input is in the form of highly refined, reductionist methodology conceived food products that are nutritionally sparse but calorically dense. This product has come to be called Junk Food. These “ingestibles” are an engineered

²⁵² William E. Kovacic, (2008), Marketing food to children and adolescents: A review of industry expenditures, activities, and self-regulation: A Federal Trade Commission report to Congress. Federal Trade Commission.

²⁵³ “Marketing Food to Children and Adolescents,” FTC.GOV. July 2008.
<http://www.ftc.gov/os/2008/07/P064504foodmktgreport.pdf>.

²⁵⁴ “Sensory-specific Satiety,” Wikipedia. March 07, 2013. Accessed August 03, 2013.
http://en.wikipedia.org/wiki/Sensory-specific_satiety.

tapestry of salt, fat, and sugar with various binders and chemicals added to maintain the matrix. On the one hand, the food industry is meeting consumers' demands. On the other hand, the food industry may be shaping those demands.

Junk food can be defined as any food product that contributes little, if any, bonafide value to the diet, but instead provides excess calories and fat. Some examples of junk food are obvious; candy, breakfast pastries, high fat chips and dip, snacks, and high fat foods from fast food restaurants. Other junk foods are not as obvious; cereals, low fat cookies and crackers, fruity drinks, and so on. One could go a step further and make the argument that the line between junk food and/or snacks has blurred and virtually any refined product or foodstuff, with disaggregated food substrate in it is junk food.

Our limbic brains love sugar, fat, salt.... So formulate products to deliver these. Perhaps add low cost ingredients to boost profit margins. Then 'supersize' to sell more.... And advertise/promote to lock in "heavy users."
—Bob Drane, former vice president for new business strategy and development at Oscar Mayer, quoted in Salt Sugar Fat: How the Food Giants Hooked Us²⁵⁵

Junk food is by design engineered to appeal to neurological and physiological receptors within the taste buds and brain. They are designed to interact with physiological functions, promote pleasure, appeal as a sensory input, actually message pain receptors, and may have, depending on one's argument and point of view, have prescribed addictive qualities.

Processed food, and specifically junk food, is the only places where carbohydrates and fat are purposely combined as a means to engage the relationship between ones brain and stomach. Refined food also tends to have high amounts of refined fats. Refined foods also have by design dynamic contrast in terms of color, contrast, texture, and appeal.²⁵⁶

²⁵⁵ Michael Moss, *Salt, Sugar, Fat: How the Food Giants Hooked Us*. New York: Random House, 2013.

²⁵⁶ Paul McFedries, "The Jargon of Junk Food." - IEEE Spectrum. May 31, 2013. Accessed August 03, 2013. <http://spectrum.ieee.org/at-work/innovation/the-jargon-of-junk-food>.

Junk food is also purposely a designed product to be highly orosensatic and appeal to hedonic tastes centers in the brain.²⁵⁷

Food scientists, physiologists, chemists, and the food industry have built a foundation of research that demonstrates an understanding of the reward pathways from the taste buds to the pleasure centers of the brain. Food scientists have come to understand that sugar is an opioid stimulator, salt is as well, and each has their effect magnified by being mixed with fat.²⁵⁸

This is the same neurological system that heroin, morphine, alcohol, and cannabinoids interact with. Our taste buds are more sensitive when hungry as well. Scientists have also discovered that humans have more taste sensations than first thought, perhaps more than most other species.

Because salt, fat, and carbohydrates were critical in human development, we evolved with a necessity to seek and crave them. Therefore, it should be no surprise that our sensory system and most innate food desires involve singularly or a combination of salt, sugar, and fat. What is purposely designed in this fashion? Refined or junk food. Junk food's aroma, texture, and taste converge within the brains pleasure center. Are junk foods or sugar addictive? "Highly palatable foods and highly potent sexual stimuli are the only stimuli capable of activating the dopamine system with anywhere near the potency of addictive drugs," according to Professor Bartley Hoebel, a psychologist at Princeton University.

Professor Hoebel hypothesized that under certain conditions, such as repetitive, intermittent bingeing on very sweet food, feeding behavior might lead to a natural form of substance abuse.²⁵⁹ The exponential rise in obesity and Type 2 diabetes, coupled with

²⁵⁷ "Food Perception Theories - The Food Theories," January 5, 2012. Accessed August 03, 2013. <http://thefoodtheories.weebly.com/1/post/2012/1/post-title-click-and-type-to-edit.html>.

²⁵⁸ Steven Witherly, PhD, "Why Humans Like Junk Food." Technicalproductsinc. <http://www.technicalproductsinc.net/PDF%20files/Why%20Human's%20Like%20Junk%20Food%20Part%20Two4.pdf>.

²⁵⁹ Nicole M. Avena, Pedro Rada, and Bartley G. Hoebel, "Evidence for Sugar Addiction: Behavioral and Neurochemical Effects of." Obesity and Food Addiction Summit. September 14, 2006. Accessed August 03, 2013. <http://www.foodaddictionsummit.org/docs/Hoebel-sugaraddiction.pdf>.

the emergence of scientific findings of parallels between drugs of abuse and palatable foods, has given credibility to this idea.²⁶⁰ In 2007, researchers at the University of Bordeaux, France, reported that when rats were free to choose eating a calorie free sweetener or intravenous cocaine, 94% chose or preferred the sweetener.²⁶¹²⁶² Junk food is designed to be arousing, stimulating, pleasurable, and initiate rebound eating.

Is sugar toxic and/or addictive? It very well may be. Eric Stice, PhD, a neuroscientist at the Oregon Research Institute has, with the assistance of functional magnetic resonance imaging (fMRI) scans, has concluded that when sugar is ingested dopamine is released, and the pleasure centers of the brain are fired. Sugar ingestion activates the same brain regions as cocaine.²⁶³ In addition, Stice observed that heavy and routine users develop what amounts to a tolerance and require more sugar ingestion to physiologically re-create the same pleasurable feelings in the brain.²⁶⁴ That is also called addiction.

Nora Volkow, MD, a psychiatrist at the National Institute on Drug Abuse, has done similar research using brain imaging techniques to show similarities between the brains of people who are obese and people who abuse drugs and alcohol.²⁶⁵ Volkow believes that the hormone leptin, a necessary hormone in suppressing hunger and creating the sensation of satiety are lessened in effectiveness in the obese. Once leptin ceases to have its desired effect, the same D2 receptors in the brain require more and more doses of sugar to create the same pleasurable feeling.

²⁶⁰ Ibid.

²⁶¹ Paul John Scott. "Are Carbs More Addictive Than Cocaine?" Details. March 2011. Accessed August 03, 2013. <http://www.details.com/style-advice/the-body/201103/carbs-caffeine-food-cocaine-addiction>.

²⁶² Magalie Lenoir, Fuschia Serre, Lauriane Cantin, and Serge H. Ahmed, "Intense Sweetness Surpasses Cocaine Reward." National Center for Biotechnology Information. July 4, 2007. Accessed August 03, 2013. <http://www.ncbi.nlm.nih.gov/pubmed/17668074>.

²⁶³ Alexis Conason, "Eating Mindfully." Psychology Today. April 4, 2012. Accessed August 03, 2013. <http://www.psychologytoday.com/blog/eating-mindfully/201204/sugar-addiction>.

²⁶⁴ Alexis Conason, "Eating Mindfully." Psychology Today. April 4, 2012. Accessed August 03, 2013. <http://www.psychologytoday.com/blog/eating-mindfully/201204/sugar-addiction>.

²⁶⁵ Gene-Jack Wang, Nora D. Volkow, Joanna Fowler, and Panayotis K. Thanos, "Imaging of Brain Dopamine Pathways." National Institute of Health. March 3, 2009. doi:10.1097/ADM.0b013e31819a86f7.

Nicole Avena, PhD, a psychologist at Princeton University, was even able to induce sugar dependency in rats. Her studies involved rats that were allowed to binge on sugar in order to promote a surge of dopamine secretion in the brain. After a month, the structure of the brains of these rats had adapted to increased dopamine levels, showing fewer of a certain type of dopamine receptor than they used to have and more opioid receptors. These dopamine and opioid systems are involved in motivation and reward, systems that control wanting and liking something. Similar changes also are seen in the brains of rats on cocaine and heroin.²⁶⁶

Kimberly Stanhope of the University of California, Davis has also conducted numerous studies on the behavior or sugar, HFCS, and cholesterol profiles. Stanhope set out to observe if ingestion of HFCS suppressed leptin (suppresses hunger) and caused fat accumulation. Results from both short-term and long-term studies show that fructose consumption does result in decrease circulation levels of both leptin and insulin.²⁶⁷ Because insulin and leptin function as critical hormones regarding consumption and metabolism, it appears that regular ingestion of fructose could lead to increased caloric intake or decreased caloric expenditure, thereby, contributing to weight gain and obesity.²⁶⁸

Research to be presented at the Annual Meeting of the Society for the Study of Ingestive Behavior (SSIB), the foremost society for research into all aspects of eating and drinking behavior, shows that eating a junk-food diet during pregnancy changes the development of the opioid signaling pathway in the baby's brain and permanently alters the way this system operates after birth.²⁶⁹ So, in layman's terms, even though food

²⁶⁶ Nicole M. Avena, Pedro Rada, and Bartley G. Hoebel, "Result Filters." National Center for Biotechnology Information. January 1, 2009. Accessed August 03, 2013. <http://www.ncbi.nlm.nih.gov/pubmed/17617461>.

²⁶⁷ Kimber L. Stanhope, and Peter J. Havel, "Endocrine and Metabolic Effects of Consuming Beverages." Endocrine and Metabolic Effects of Consuming Beverages Sweetened with Fructose, Glucose, Sucrose, or High-fructose Corn Syrup. Accessed August 03, 2013. doi:10.3945/ajcn.2008.25825D.

²⁶⁸ Ibid.

²⁶⁹ Z. Y. Ong, and B. S. Muhlhausler, Maternal "junk-food" feeding of rat dams alters food choices and development of the mesolimbic reward pathway in the offspring. FASEB J July 2011 25:2167–2179; published ahead of print March 22, 2011, doi:10.1096/fj.10–178392.

companies are simply providing for consumers desires, there is at least, anecdotally, an argument that they are conditioning their customers for future use as well.

The food industry is acutely aware of all of these studies and uses the same conclusions to ensure our consumption habits do not decrease. It is not in the food industries interest for behavior to change.

And our sugar and carbohydrate consumption is unprecedented.

According to the Food and Agriculture Organization of the United Nations (FAO), the United States consumes on average a minimum of 600 calories a day from sugar. This is the most consumption of sugar in the world. It may be a conservative estimate of consumption as well. Some studies estimate that the current average of sugar consumption is 42.5 teaspoons of sugar per day.²⁷⁰ That is just shy of one-half a pound of sugar. This does not include other refined carbohydrates.

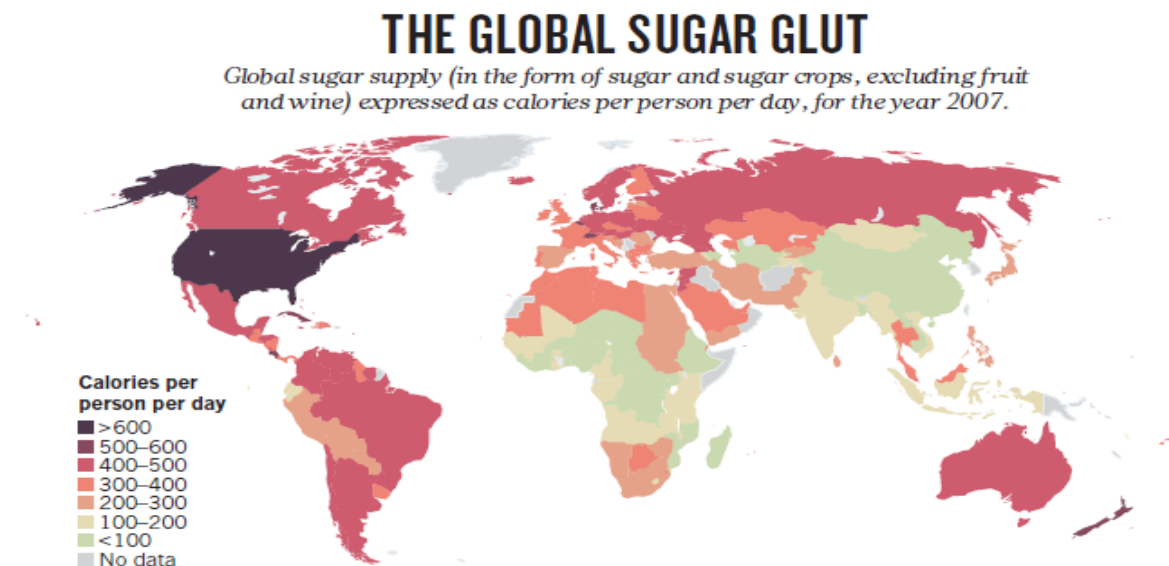


Figure 12. The Global Sugar Glut provided by Nature magazine

²⁷⁰ “How Much Sugar Do You Eat? You May Be Surprised.” [www.dhhs.nh.gov](http://www.dhhs.state.nh.us/dphs/nhp/adults/documents/sugar.pdf).
<http://www.dhhs.state.nh.us/dphs/nhp/adults/documents/sugar.pdf>.

Internationally, we also consume the most soft drinks in the world.

According to Nation Master, a massive central data base sourced by data from the many data fields to include but not limited to the Central Intelligence Agency World Fact book, The United Nations, the World Health Organization, and the Organization for Economic Co-operation and Development (OECD) were able to determine what nation consumes the most soda in the world. The figure demonstrates the amount of soda consumed per person, by liter, annually consumed.²⁷¹ According to this data, individual Americans consume on average 216 liters of soda per person per year.

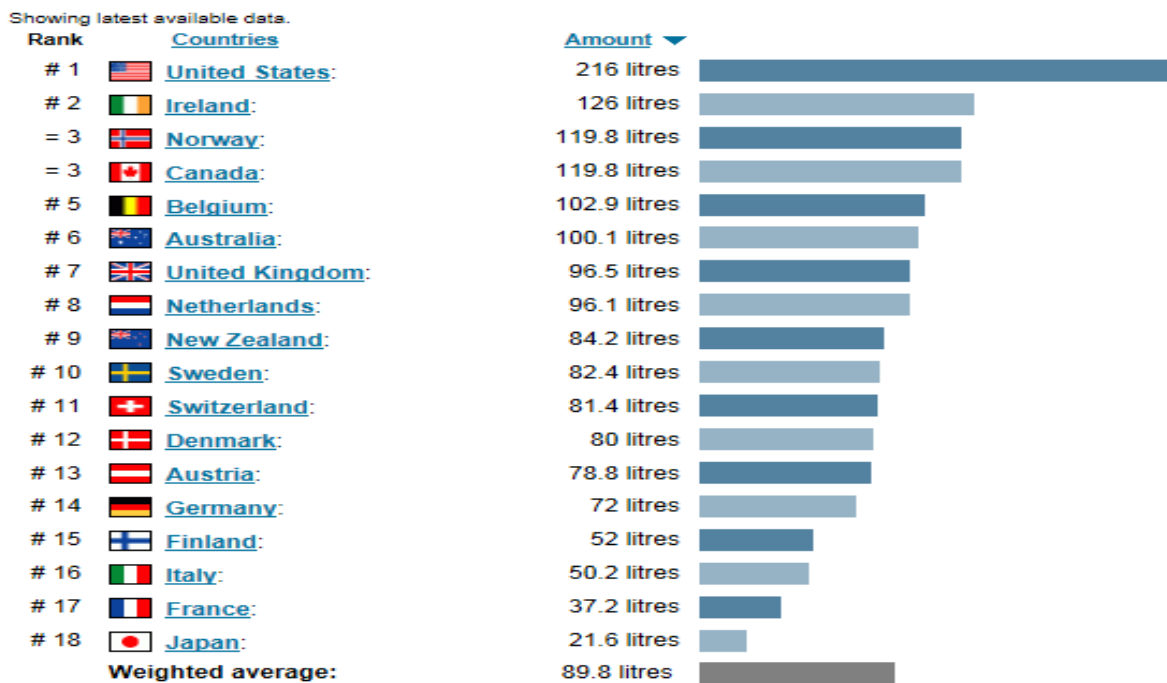


Figure 13. Amount of Soda Consumed per Person by Liter. Provided by Global Market Information

²⁷¹ Global Market Information, Database “Soft Drink Consumption Statistics - Countries Compared.” NationMaster.com. Accessed August 03, 2013. http://www.nationmaster.com/graph/foo_sof_dri_con-food-soft-drink-consumption.

And numerous studies have demonstrated a link between liquid carbohydrates, soda consumption, and obesity.^{272 273}

Also according to the Organization for Economic Co-operation and Development (OECD), the United States pays more per capita for health care than any other country. We spend the least amount of money on food and the most amount of money on health care.²⁷⁴

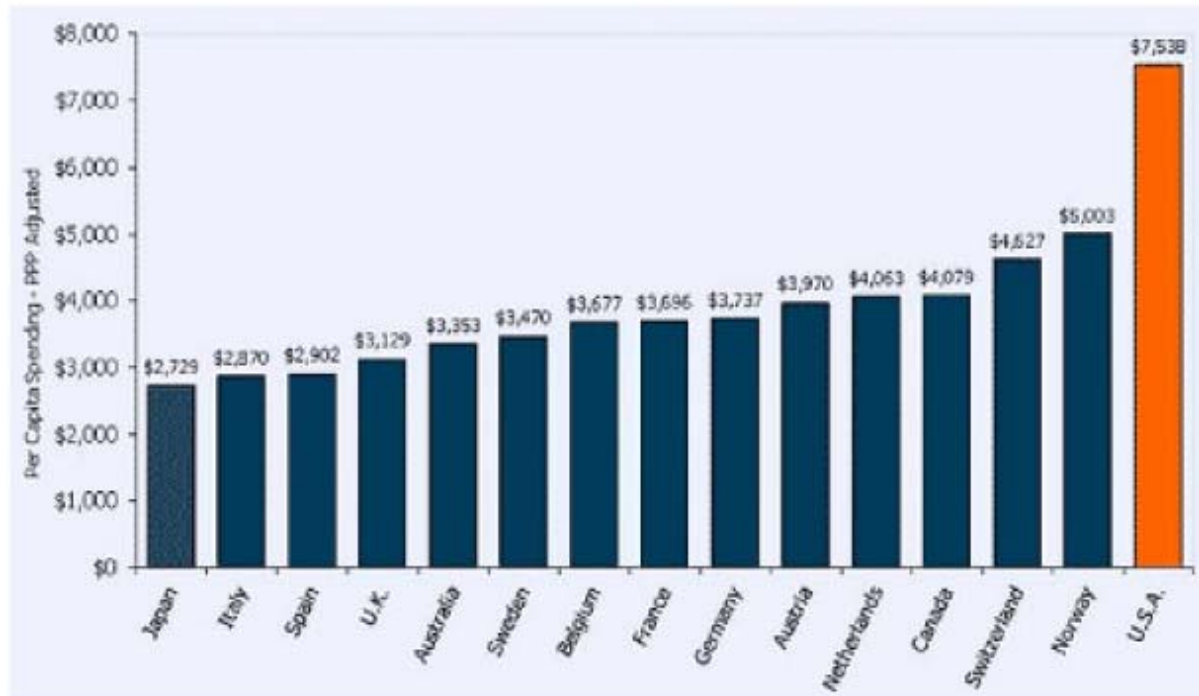


Figure 14. Dollars Spent on health care, per Country

²⁷² Sharon Begley, "Can It! Soda Studies Cite Stronger Link to Obesity." Reuters. September 21, 2012. Accessed August 03, 2013. <http://www.reuters.com/article/2012/09/21/us-obesity-soda-idUSBRE88K17820120921>.

²⁷³ Doreen P. DiMeglio, and Richard D. Mattes, "Liquid versus Solid Carbohydrate: Effects on Food Intake and Body Weight." International Journal of Obesity/www.nature.com/ijo 24, no. 6 (June 2000): 794–800.

²⁷⁴ "Snapshots: Health Care Spending in the United States & Selected OECD Countries," Snapshots: Health Care Spending in the United States & Selected OECD Countries. April 12, 2011. Accessed August 03, 2013. <http://kff.org/health-costs/issue-brief/snapshots-health-care-spending-in-the-united-states-selected-oecd-countries/>.

The data does demonstrate that there has been an increase in sugar consumption. It also demonstrates through a variety of studies that sugar consumption, particularly when in liquid form, increases weight gain. And as we see from the graph, the United States pays significantly more in health care than the rest of the world. Perhaps there is an error or cognitive dissonance with regard to what has made us fat.

D. PART IV—THE FOOD INDUSTRY

1. The Energy Balance Debate

If calories are all the same, and we eat so much more than before, why are we not all 1300 pounds?

What about the argument that Americans eat anywhere from 200–600 calories more a day than they did 40 years ago? According to Chapter II of the USDA fact book, Americans at the beginning of the 21st century are consuming more food and several hundred more calories per person per day than Americans did in the 1950s (when per capita calorie consumption was at the lowest level in the last century), or even in the 1970s. The aggregate food supply in 2000 provided 3,800 calories per person per day, 500 calories above the 1970 level and 800 calories above the record low in 1957 and 1958.²⁷⁵

If the energy balance argument (calories in and calories out) argument is accurate, then the following numbers would also be accurate.

For the purposes of math and using an amount within the estimated range, with an additional intake of 500 calories per day, the excess calories would be equivalent to 3500 calories per week—3500 calories is equivalent to one pound of fat. That means, based on the current consumption data every month, we would on average gain 4 pounds of body fat. And to further extrapolate the math, the weight gain would be an additional 48 lbs. a year, 480 lbs. in ten years and 960 pounds over 20 years.

²⁷⁵ “Profiling Food Consumption in America Agriculture; Fact Book,” USDA.GOV. <http://www.usda.gov/factbook/chapter2.pdf>.

This is the extreme of the argument. It is also overly simplistic. But so then is the idea that obesity is simply a matter of eating too much and doing too little. If it were simply the mathematical argument that the fitness industry, the food industry, the pharma industry, and the medical industry generally makes it, then this would be the end result. But this is not the case. This is the fallacy of the energy argument and a mere calorie in and out argument.

The fact that there are not millions of people walking around, as if they would be able to, weighing between 1100 and 1300 pounds indicates that the obesity epidemic is more than a calorie argument. It is not a pure energy argument much to the chagrin of the calorie counters.

Perhaps it is more complex than the argument previously discussed. Perhaps it is not a physical issue, but a physiological issue and/or an endocrine issue.²⁷⁶ What is not taken into account or has not been adequately determined is the array of hormones and their interactions and contraindications as they relate to food and homeostasis. One of the most important hormones involved in this discussion is insulin. Insulin is a protein that is secreted from the pancreas as a tool to carry glucose to the cells. Type 1 diabetes is when the pancreas secretes no insulin. Type 2 diabetes is when the pancreas does secrete insulin, but cannot keep up with the amount of sugar that is ingested. Chronic secretion of insulin leads to a condition called insulin resistance,²⁷⁷ or metabolic syndrome.²⁷⁸ It is metabolic syndrome that leads to Type 2 diabetes.

Insulin is greatly affected by carbohydrates, specifically refined carbohydrates. If there is insulin in the blood, cells will not release fat for use as fuel. Chronically elevated insulin levels are a telltale sign of insulin resistance. Insulin resistance creates significant fat accumulation around the abdomen. This metabolic condition is a condition that did

²⁷⁶ Gary Taubes, "Treat Obesity as Physiology, Not Physics." *NATURE* 492, no. 7428 (December 12, 2012): 155–56.

²⁷⁷ "Metabolic Syndrome," Wikipedia. February 08, 2013. Accessed August 03, 2013. http://en.wikipedia.org/wiki/Metabolic_syndrome.

²⁷⁸ "Insulin Resistance," Wikipedia. February 08, 2013. Accessed August 03, 2013. http://en.wikipedia.org/wiki/Insulin_resistance.

not exist 30–35 years ago. The increasing excretion of insulin from the pancreas drives more and more energy into the cells, stored as triglycerides. This is how fat is stored.

With insulin sensitivity diminishing with high blood sugar, more and more insulin is excreted. In short order, damage to the beta cells of the pancreas begins and Type 2 diabetes follows. Type 2 diabetes develops when the body becomes resistant to insulin or when the pancreas stops producing enough insulin. Diabetes mellitus Type 2 (formerly noninsulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes) is a metabolic disorder that is characterized by high blood glucose in the context of insulin resistance and relative insulin deficiency. The only way Type 2 diabetes can happen is to have chronic and elevated levels of sugar in the blood. Type 2 diabetes and obesity reside side by side. There has been an exponential increase in Type 2 diabetes in the last 35 years.²⁷⁹

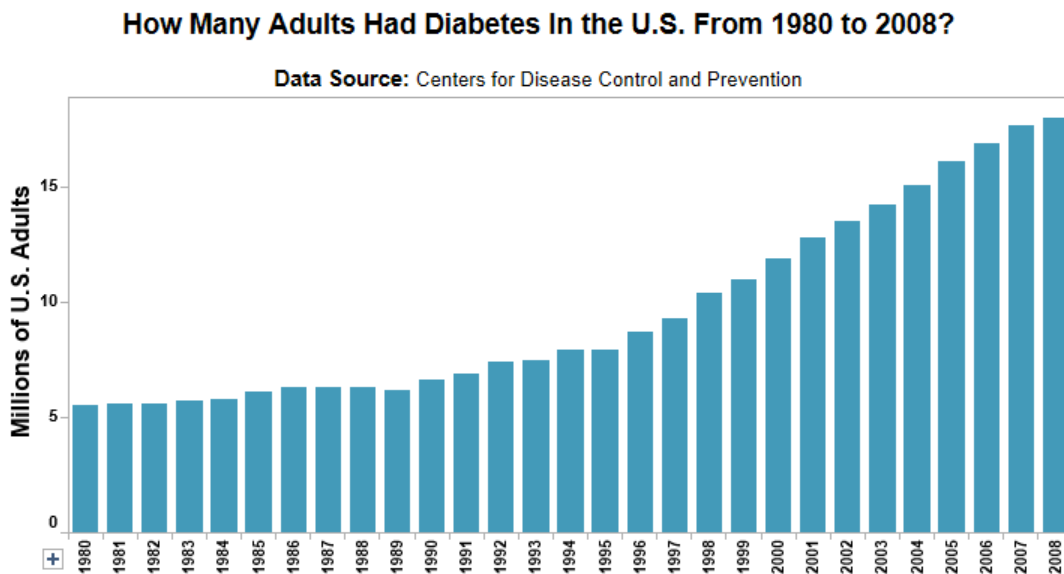


Figure 15. The Increase of obesity over time. Provided by CDC

²⁷⁹ Anthony Calabrese, “The State of the USA | Track the Rise in Diabetes Among U.S. Adults from 1980 to 2008.” The State of the USA | Track the Rise in Diabetes Among U.S. Adults from 1980 to 2008. October 26, 2010. Accessed August 03, 2013. <http://www.stateoftheusa.org/content/diabetes-on-the-rise.php>.

There has also been an exponential increase of obesity in the same period of time.²⁸⁰

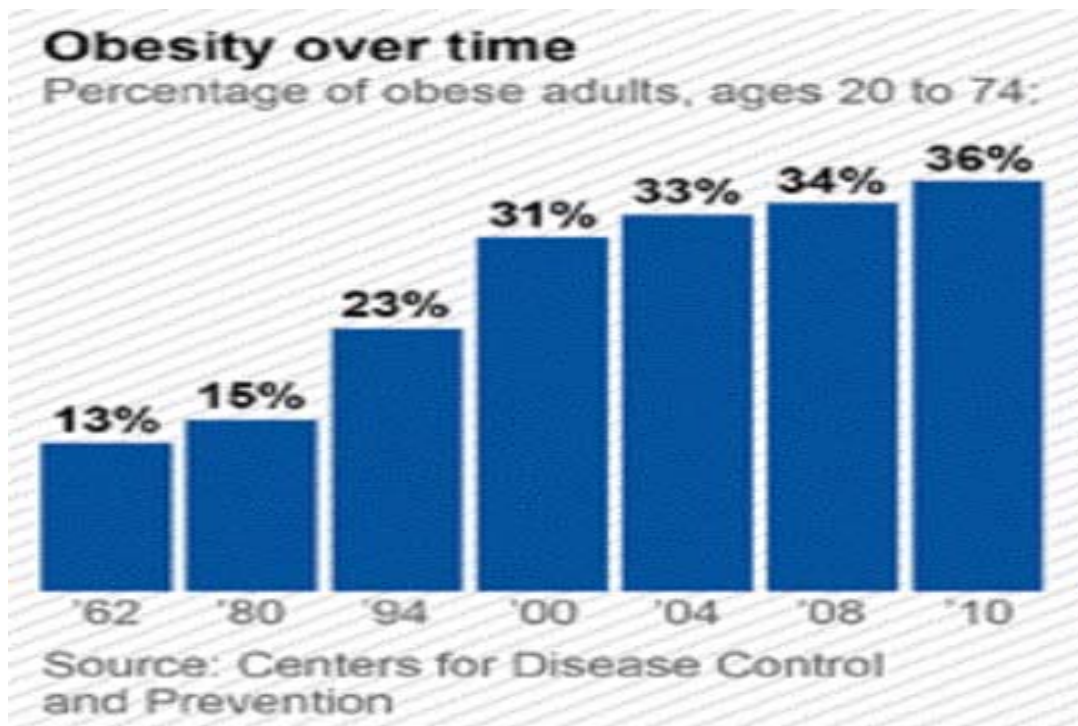


Figure 16. The increase in adult obesity provided by CDC

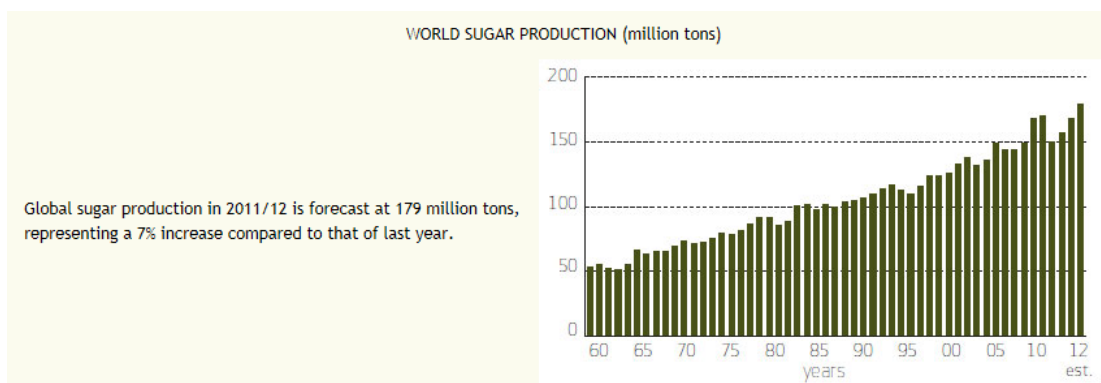


Figure 17. Annual World Sugar Consumption provided sugar industry.

²⁸⁰ Lee S Gross, Li Li, Earl S Ford, and Simin Liu, “Increased Consumption of Refined Carbohydrates and the Epidemic of Type 2 Diabetes in the United States: An Ecologic Assessment.” American Society for Clinical Nutrition. N.p., May 2004. Web. 12 Sept. 2013. Am J Clin Nutr May 2004 vol. 79 no. 5: 774–779.

There is certainly a pattern to recognize with the exponential increase of refined carbohydrates produces, consumed, and the increase of obesity and diabetes.

Carbohydrate consumption has tripled in the last 35 years.²⁸¹ Obesity has increased over the last 35 years. Calorie consumption has decreased. Dietary fat consumption has decreased. Exercise has increased. So is it an energy argument or an endocrine argument?

There are many refined carbohydrates that in their preparation act as diabetes enhancers or initiators. One potential or postulated reason is the bleaching agent used in whitening of wheat. Chlorine dioxide²⁸² combines with some of the thousand or so residual proteins in the flour to form alloxan.²⁸³ Alloxan destroys the beta cells of the pancreas.²⁸⁴ These beta cells, once destroyed, no longer produce insulin and cause diminished insulin production and summarily diabetes.²⁸⁵ This whitening process in conjunction with refining the wheat also removes some 14 vitamins, 10 minerals and amino acids from the plant.²⁸⁶

It is also known that researchers use alloxan in lab rats to induce diabetes.²⁸⁷ That is one reason this current strain of wheat is a potential culprit in the growing obesity epidemic in the United States.²⁸⁸ Wheat is a carbohydrate. And practically every refined food, bread, snack, pie, cake, and cracker is made with this refined flour. We are also

²⁸¹ Robert Lustig, Laura Schmidt, and Claire Brindis, "The Toxic Truth about Sugar." *Nature* 482 (February 2, 2012): 27–30.

²⁸² "Refined White Flour," Accessed August 03, 2013. http://www.wholevegan.com/refined_flour.html.

²⁸³ Richard E. Heikkila, Bradley Winston, and Gerald Cohen, "Alloxan-induced Diabetes—evidence for Hydroxyl Radical as a Cytotoxic Intermediate." *Biochemical Pharmacology* 25, no. 9 (May 1, 1976): 1085–092.

²⁸⁴ *Ibid.*

²⁸⁵ Diabetes Basics, Type 2. Accessed August 03, 2013. <http://www.diabetes.org/diabetes-basics/type-2/>.

²⁸⁶ "Refined White Flour," Accessed August 03, 2013. http://www.wholevegan.com/refined_flour.html.

²⁸⁷ Timothy Ferriss, *The 4-hour Body: The Secrets and Science of Rapid Body Transformation*. London: Vermilion, 2011.

²⁸⁸ Mark Hyman, MD, "Three Hidden Ways Wheat Makes You Fat." *The Huffington Post*. February 18, 2012. Accessed August 03, 2013. http://www.huffingtonpost.com/dr-mark-hyman/wheat-gluten_b_1274872.html.

aware via research and clinical trials that foods with a high glycemic index induce people to store belly fat, initiate the instances of inflammation in the body and also create fatty and cirrhosis of the liver. This problem now affects every other American and is speculated by a growing body of scientists and researchers as the major driver of nearly all chronic disease and most our health care costs. Diabetes now uses one in three Medicare dollars.²⁸⁹

At the very least, one must recognize the *possibility* of a correlation or even an association. To not examine all evidence renders only half answers. Energy balance and the calories in/calories out may be correct. It may be incorrect also. According to Pubmed (PubMed comprises more than 22 million citations for biomedical literature from MEDLINE, life science journals, and online books) in 1956, there were less than 200 published articles on obesity in the medical literature. Last year, over 16,000 were published. Considering that epidemic of obesity research coincides with an epidemic of obesity, it is a compelling argument to at least consider the possibility that the conventional understanding of the disease is incorrect.²⁹⁰

If, in 1980, a realization that children were dying of a disease and their death continued exponentially for 35 years, much like obesity despite the purported cause and cure would not there be outrage nationally and internationally? Would not scientists and academics be driven to ascertain something was missed? Or would those who did the science and research simply blame the children?

In a nation driven by risk assessments and averseness, with the enforcement of safety, wearing of seat belts, speeding enforcement, regulation of tobacco and alcohol, and a litany of behavioral regulations in order to “protect us,” how can we continue to grow obese? According to the homepage of the Department of Homeland Security;

The Department of Homeland Security has a vital mission: to secure the nation from the many threats we face...our duties are wide-ranging, but our goal is clear - keeping America safe.

²⁸⁹ The Diabetes Care Project, Accessed August 03, 2013.
<http://www.diabetescareproject.org/diabetes-fast-facts.html>.

²⁹⁰ Gary Taubes, “Thesis Update.” Email message to author. July 7, 2013.

E. PART V—THE FOOD INDUSTRY

1. Culpability or Business Model

Is the food industry, as culpable as it may appear to be, or are they simply competing for finite dollars and market share? In 2003, the World Health Organization published a study called *Diet, Nutrition, and the Prevention of Chronic Diseases*.²⁹¹ It is a lengthy document about the role of food, global markets and their impact on world health. One of the strongest statements in the document is that drinks that are rich in sugar increase overall energy intake and reduce appetite control.²⁹²

In response, JPMorgan did a 2003 risk analysis in preparation for legislation and its impact on shareholder value. JP Morgan, a world leader in investment banking, financial services for consumers, small business, commercial banking, financial transaction processing, asset management and private equity published a study on behalf of The United Nations Environment Programme Finance Initiative (UNEP FI). “Obesity: The Big Issue” (Langlois et al., 2003), outlined the potential economic impact of obesity issues on shareholder value.²⁹³²⁹⁴²⁹⁵ To be candid, the necessity of such a report is a fiduciary responsibility and must be done to inform shareholders.

The UNEP FI works closely with 160 financial institutions worldwide, to develop and promote linkages between the environment, sustainability and financial performance. How firms compete, what society cares about, and how costs are distributed determine which Corporate Social Responsibility (CSR) issues are likely to be important for an

²⁹¹ Diet, Nutrition, and the Prevention of Chronic Diseases: Report of a WHO-FAO Expert Consultation. [Joint WHO-FAO Expert Consultation on Diet, Nutrition, and the Prevention of Chronic Diseases, 2002, Geneva, Switzerland]. Geneva: World Health Organization, 2003.

²⁹² Ibid., 57.

²⁹³ J. P. Morgan, 2003. Food Manufacturing. Obesity: The Big Issue. European Equity Research. April 16.

²⁹⁴ J. P. Morgan, Food Manufacturing: Obesity the Big Issue. London: JP Morgan European Equity Research, 2003.

²⁹⁵ Martin Caraher, Jane Landon, and Kath Dalmeny, (2006), Television advertising and children: lessons from policy development. *Public Health Nutrition*, 9(5), 596 - 605. doi: 10.1079/PHN2005879 <<http://dx.doi.org/10.1079/PHN2005879>>, 10.

industry or for individual firms, in terms of financial impact, together with the extent of a firm's exposure anywhere in the business. The report goes on to identify the most important of the impacts of risk (financial, economic, operational, environmental, social, or governance) on the business model and the share price, is how firms handle the risk.

The JP Morgan report noted six critical issues that have been identified for the food and beverage sector. They are; obesity, climate change, supply chain, availability of fresh water, product risk, and waste management.²⁹⁶ The interconnectedness of these sectors is also a critical recognition. The report goes on to discuss the top three risks as their primary point of focus. Obesity is the food and beverage industries number one risk. "Obesity is a serious concern for the food and beverage industry," and "Despite several attempts to introduce legislation to help combat the obesity problem at a federal level, none of the initiatives in the USA have succeeded yet. Federal agencies such as the Food Trade Commission and the Food and Drug Administration have not taken an increased role in regulations; in fact they have clearly stated they are more in favor of self-regulation."

Why? Because it is not in that industries' interest for consumers behavior to change. The report then goes on to determine what companies had the most exposure to risk with regard to their CSR.

The most exposed companies to financial risk in this study were;

²⁹⁶ Julie Hudson, CFA, Melissa Earlam, Alan Erskine, Kaumil S. Gajrawala, Caroline S. Levy, David Palmer, and Chris Pitcher, "UBS Investment Research; Food and Beverages: Corporate Responsibility." [Www.ubs.com/investment_research](http://www.ubs.com/investment_research). October 24, 2005.
http://www.unepfi.org/fileadmin/documents/materiality2/food_and_bev_ubs_2005.pdf.

Table 1: JPMorgan ranking of exposure of total portfolio to obesity risk
(% of 2002 revenue)

Rank	Company	% of "not so healthy" food	% of "better than" + "healthy" food	% of non-food
1	Hershey	95%	5%	0%
2	Cadbury	88%	12%	0%
3	Coca-Cola	76%	24%	0%
4	PepsiCo	73%	27%	0%
5	Kraft	51%	49%	0%
6	Kellogg	38%	62%	0%
7	Wrigley	35%	65%	0%
8	General Mills	35%	65%	0%
9	HJ Heinz	32%	66%	2%
10	Campbell	23%	77%	0%
11	Unilever	23%	35%	43%
12	Nestlé	22%	60%	18%
13	Danone	20%	80%	0%
14	Sara Lee	18%	34%	48%
15	P&G	8%	1%	91%
16	Reckitt	2%	4%	94%

Source: Company data, JPMorgan estimates.

Figure 18. Companies with highest risk exposure due to obesity. Provided by JPMorgan

It would appear, at least by these studies and reports that the obesity epidemic was returning dividends and investment opportunities may have been negated if legislation was enacted to curb industry behaviors. Note, the first four companies deal in some kind of sugar related product and all 15 are refined food companies.

To further complicate the understanding of their relationships, these companies hold executive board positions on the American Council of Fitness and Nutrition (ACFN).²⁹⁷ The American Council for Fitness and Nutrition (ACFN) is a nonprofit organization that brings together food and beverage companies, associations, and health and nutrition advocates to work toward viable long-term solutions to the nation's obesity epidemic. ACFN represents a diverse group of organizations and is guided by an advisory board of experts in the fields of nutrition, physical activity and behavior change. ACFN works with partners to raise awareness of programs and policies that seek to improve health and wellness in America.²⁹⁸

²⁹⁷ Michele Simon, *Appetite for Profit: How the Food Industry Undermines Our Health and How to Fight Back*. New York: Nation Books, 2006. 177–78.

²⁹⁸ "AMERICAN COUNCIL FOR FITNESS AND NUTRITION FOUNDATION," Accessed August 03, 2013. <http://www.guidestar.org/organizations/20-5911029/american-council-fitness-nutrition-foundation.aspx>.

However, there is nothing about fitness and nutrition mentioned when one researches this organization. Instead, it has all the relationships, appearances and behaviors of a food industry lobbyist.²⁹⁹ Dr. Susan Finn, President and CEO of AFCN, had been quoted telling Knight-Ridder Newspapers' Washington Bureau that junk-food-stocked vending machines in schools play no role in the child obesity crisis.³⁰⁰³⁰¹ That is a very interesting point of view.

There would appear to be a conflict of interest, at least on the surface that foods with sugar being their prominent ingredient would be acutely aware of their risk with regard to the growing obesity increase and also aligning themselves with pseudo health, fitness, and science groups that are in essence, lobbying firms in Washington, DC.

The complicated relationship furthers still with the American Council of Science and Health.). According to their website, The American Council on Science and Health was founded in 1978 by a group of scientists who had become concerned that many important public policies related to health and the environment did not have a sound scientific basis. These scientists created the organization to add reason and balance to debates about public health issues and to bring common sense views to the public. ACSH is a national, nonprofit, tax-exempt 501(c)(3) consumer health education and advocacy organization based in New York City They are also funded by donations by the same parties mentioned as having the greatest risk with regard to obesity.

²⁹⁹ "Fake Health Groups with Junk-food Ties," Accessed August 03, 2013.
<http://www.bridges4kids.org/articles/2003/9-03/PASASF9-03.html>.

³⁰⁰ "American Council for Fitness and Nutrition," SourceWatch. Accessed August 03, 2013.
http://www.sourcewatch.org/index.php?title=American_Council_for_Fitness_and_Nutrition.

³⁰¹ "Fake Health Groups Funded by," EducationNews. <http://www.educationnews.org/fake-health-groups-funded-by-the.htm>.

However, they too are financed by the likes of previous mentioned companies. Their donors include:

Coca-Cola	PepsiCo	General Mills
Kellogg's	Kraft Foods	Nestle
American Beverage Company	The Sugar Association	

The sugar association is also a very interesting organization in terms of their relationship with a variety of fitness and health organizations. It is alleged that the Sugar Association threatened the WHO with withdrawal of \$406M in funding if any attempt to limit sugar intake was initiated.³⁰² Similarly in a Mother Jones Article entitled Sweet Little Lies, it was discovered that the largest sugar manufacturers had begun to see declines in sugar consumption after several studies linked sugar to obesity, heart disease, and diabetes. Their solution was to co-op the science by building a stable of nutritional and scientific experts to allay, refute, cajole, or diminish legislative bodies' interest in sugar being a recognized and potential key ingredient in the proliferating diabetes and obesity increases in the United States.³⁰³

There is a recurring pattern with regards to how these associations are formed and who are their primary leadership and donors.³⁰⁴ The idea that there is a conspiracy and cabal trying to hijack and/or distort the science and facts with regard to the role of industrial food industry has always been disconcerting and disingenuous in terms of argument. However, there appears to be ample evidence that if one were to make the case that the food industry may be complicit and aware of their role in the obesity epidemic, the aforementioned associations would be reasonable cause to seek an indictment.

³⁰² Sarah Boseley, "Sugar Industry Threatens to Scupper WHO." The Guardian. April 21, 2003. Accessed August 03, 2013. <http://www.guardian.co.uk/society/2003/apr/21/usnews.food>.

³⁰³ Cristin Kearns Couzens, "Big Sugar's Sweet Little Lies." Mother Jones. November 2012. Accessed August 03, 2013. <http://www.motherjones.com/environment/2012/10/sugar-industry-lies-campaign>. Supplemental data; documents referred to in piece; <http://www.motherjones.com/environment/2012/10/sugar-industry-internal-documents-revealed>.

³⁰⁴ "American Council on Science and Health," SourceWatch. Accessed August 03, 2013. <http://www.sourcewatch.org/index.php?title=ACSH>.

And every country that has adopted this highly processed, industrialized and low cost western diet has experienced an exponential increase in obesity.³⁰⁵

The industrial food system holds a significant responsibility in the nature and state of America's health. While complex, there would appear to be enough anecdotal, relational, associative, and perhaps even some correlation and causation with regard to the effects of the industrial food industry and its role in obesity. The argument rages on about if the food industry does or does not have a role in obesity.

In 2007, The Giannini Foundation of Agricultural Economics refuted the idea that subsidies to the agribusiness and industrial food system were making us obese. "The claim that farm subsidies have contributed significantly to making Americans fat by making fattening foods relatively cheap and abundant has become accepted as "fact" in the popular media. We show that there is no evidence to support this claim."³⁰⁶ The Giannini Foundation of Agricultural Economics was founded in the 1920s from a \$1.5 million gift to the University of California from the Bancitaly Corporation in honor of its founder, A. P. Giannini. This fund has now grown to \$20 million and is used to promote and support research on the economics of California agriculture.

In 2012, the state's 81,500 farms and ranches received a record \$43.5 billion for their agricultural output last year, up from the \$38 billion reached during 2010. California remained the number one state in cash farm receipts with 11.6% of the U.S. total. The state accounted for 15% of national receipts for crops and 7.4% of the U.S. revenue for livestock and livestock products.³⁰⁷ It is in the best interest of this industry to not have a disruption. However, there are different points of view on this idea.

In July of 2013, a different report outside the agricultural industry was published.

³⁰⁵ Laura A. Schmidt, Claire D. Brindis, and Robert H. Lustig, "The Toxic Truth about Sugar." *Nature*, February 2, 2012.
http://accelerate.ucsf.edu/uploads/pilotawards/1331566366/the_toxic_truth_about_sugar.pdf.

³⁰⁶ Julian M. Alston, Daniel A. Sumner, and Stephen A. Vosti, "Farm Subsidies and Obesity in the United States: National Evidence and International Comparisons." *Food Policy* 33, no. 6 (2008): 470–79. doi:10.1016/j.foodpol.2008.05.008.

³⁰⁷ "California Department of Food and Agriculture," CDFA STATISTICS. Accessed August 03, 2013. <http://www.cdfa.ca.gov/statistics/>.

Titled the Agricultural Subsidies and the American Obesity Epidemic, the report opens specifically with the following;

Government-issued agricultural subsidies are worsening obesity trends in America.

Current agricultural policy remains largely uninformed by public health discourse. Although findings suggest that eliminating all subsidies would have a mild impact on the prevalence of obesity, a revision of commodity programs could have a measurable public health impact on a population scale, over time.³⁰⁸

The paper further states that no financial disclosures were reported by the authors.³⁰⁹

Subsidizing the agribusiness/industrial food machine may be a reason why obesity has exponentially increased over the last 40 years. From Faber to McGovern, it becomes evident that policies and decisions made initially with the very best of intentions of Americans, economics, and food development and distribution may actually be the source of the obesity epidemic.

The fact that our entire food system is built not for providing sustenance but commerce should indicate that our priorities are not in order. We spend more money on health care than any other nation on earth. That is because generally speaking, we are sicker. We spend the least amount of money on food than any other nation in the world. Why are we surprised that we are getting fat?

Over the past 50 years, consumption of sugar has tripled worldwide. It is no ordinary, innocuous commodity. In a book called, Alcohol; No ordinary Commodity, author Thomas Babor and his colleagues established a framework that demonstrated a necessity for regulating alcohol.

³⁰⁸ Caroline Franck, Sonia M. Grandi, and Mark J. Eisenberg, "Agricultural Subsidies and the American Obesity Epidemic." *American Journal of Preventive Medicine* 45, no. 3 (September 2013).

³⁰⁹ *Ibid.*, 6.

Unavoidability (pervasiveness in society), toxicity, potential for abuse, and negative impact for society are his four keys attributed to framework nodes.³¹⁰ Does sugar also meet these same framework nodes for regulation? Sugar used to be only a seasonal commodity. It was harvested only a few months a year and at significantly lower amounts. Nature and photosynthesis made attaining sugar difficult. The current agricultural production and industrial food system makes it ubiquitous. Is sugar toxic? Depending on the myriad of studies, counter studies, lobbyists, and advocates, it may in fact be. Then again it may not.

There is enough evidence to strongly suggest that sugar has a direct epidemiological effect on the endocrine system and metabolic system so much so that it is directly linked to a pronounced, if not exponential increase, in insulin sensitivity, metabolic syndrome, and Type 2 diabetes. Fructose consumption and its metabolism are linked to a host of activities. Fructose is not metabolized in the stomach like glucose but in the liver. Some studies have fructose having the same impact on the liver as alcohol. Imagine cirrhosis of the liver being linked to fructose and/or alcohol.

Sugar dampens the effectiveness of leptin, a hormone that signals the brain that we are full and increases the production of ghrelin, a hormone that signals the brain that we are hungry.³¹¹ Sugar also fires very specific neurons in the brain. These synaptic series are identical to opiate receptors in the brain. Sugar activates the pleasure centers of the brain much like opiates.

What about negative impacts on society? Obesity, and its related causes, cost hundreds of billions of dollars being spent on treatment in lieu of research. While the links may only be associative, obesity and its link to chronic disease lost productivity, and 75% of all health dollars going to its treatment and related diseases make for a reasonable argument that all four of Babor's framework nodes are met for regulation.

³¹⁰ Thomas F. Babor, *Alcohol, No ordinary Commodity, Research and Public Policy*, Oxford University Press, 2003).

³¹¹ Robert H. Lustig, Laura A. Schmidt, and Claire D. Brindis, Sugar, the toxic truth | N A T U R E | 2 7 2 0 1 2 | V O L 4 8 2 February.

We must consider the possibility that sugar and carbohydrates and not dietary fat may be the culprit in the obesity epidemic. It is also inconceivable that the idea of sugar being easily dismissed and fat being easily demonized should concern those attempting to objectively seeking resolution to this exponentially growing problem.

Obesity and its effects are exorbitantly expensive. That makes it a homeland security issue.

Obesity impacts hundreds of millions of people. That also makes it a homeland security issue.

The bottom-line is this: something this dramatic and impacting on so much and so many must be considered a homeland security issue. It is not a semantic argument, but one of numbers; hundreds of billions annually spent in vain and 100,000,000 plus Americans are affected at a minimum. Over one-third of the American population is too obese to fight, too obese to respond, and held as exclusively responsible.

VII. DON'T SHOOT THE MESSENGER

A. CONCLUSION

Currently, there are in excess of 100,000,000 Americans that are obese.

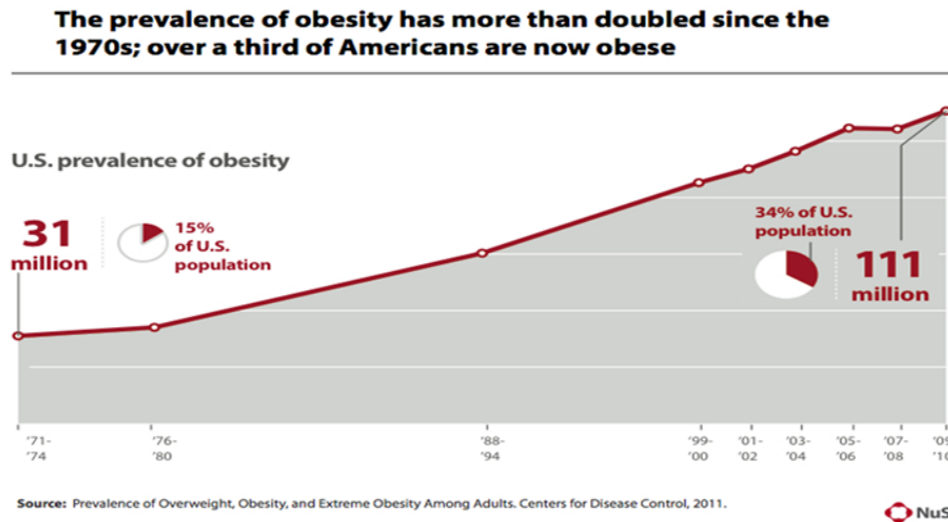


Figure 19. The Increase of Obesity in the United States. Provided by NuSi.

Having that number of citizens obese is a national and homeland security issue. That number, if it were a country, would be the 12th largest country in the world.

The very beginning of this thesis posed that obesity and its effect were a problem and were having an impact on homeland and national security. With one-third of the nation being obese and another one-third of the nation being overweight and moving towards obesity, that number grows to in excess of 200,000,000 Americans.

What are the implications of the obesity epidemic for homeland security? The implications appear clear, concise, and cogent. Obesity renders large amounts of the population unable to serve in the military and first responder community. Obesity and its effects costs hundreds of billions of dollars a year and is linked to chronic diseases.

Obesity renders those it impacts less capable, less cognitively adroit, and less likely to lead a productive life. Therefore, obesity is a national security issue.

How can having one-third of a nation's men and women being obese, unable to serve in any military capacity or as a first responder, and both direct and indirect costs of \$500 billion annually not be a national and homeland security issue?

How did the nation that won World War II build the greatest economy on earth, change the world for the better, and provide a quality of life previously unforeseen get so sick? Because we won World War II, have the greatest economy on earth and desire to build both an inexpensive and abundant industrial food system. We are effectively over fed, undernourished, and becoming less robust and resilient as a nation because of it. We eat more sugar and refined carbohydrates and food than any other country in the world. And, we are the most obese nation in the world. And, we have done this of our own accord.

Can the obesity epidemic in the United States be traced to specific policy decisions or legislation? Without question, there have been policy decisions, legislation, and business decisions that have had direct impact on how and what we eat. The USDA reversing New Deal agriculture programs and policy, the McGovern Committee recommending what to and what not to eat, and the food pyramid guidance all demonstrate policy decisions that had a role in shaping the current condition. Unintended consequences and unforeseen contraindications with the dietary guidelines are the result of these series of policy changes over the last 40 years.

Other government agencies have all published dietary and exercise guidelines—and they are being followed. Caloric consumption is down and we continue to get obese.³¹² Exercise intensity, duration, and frequency have increased, and we continue to

³¹² Alexandra Sifferlin, "Americans are Eating Fewer Calories, So Why are We Still Obese?" TIME.com." Time. Accessed August 03, 2013. <http://healthland.time.com/2013/02/22/americans-are-eating-fewer-calories-so-why-are-we-still-obese/>.

grow obese.³¹³ Multiple dietary strategies built around the eat less and exercise paradigm have been published. Yet, dieting does not work.³¹⁴ The idea that starvation and expenditure being the best alternative to changing the food system is at least a 150-year-old premise that has proven ineffective. However, we continue to maintain the same hypothesis. Einstein said; insanity is doing the same thing again and again but expecting different results. He also said we cannot create a solution with the same thinking that caused the problem.

What policy remedies could be developed to reverse this trend or mitigate its impact on homeland security? If we are to reverse the obesity epidemic, we should reverse the way and what we eat. As demonstrated throughout this thesis by all available evidence, this crisis or epidemic began with several flawed studies reinforced with other policies and culminated with the introduction of the United States Senate Select Committee on Nutrition and Human Needs, or better known as the McGovern committee's recommendations; less fat, more carbohydrates, and more fruits and vegetables. In order to reverse the current course, we must reverse the inputs. We must return to a diet that is higher in dietary fat, lower in overall carbohydrates, and lower in all refined foods, period.

The abundance of cheap, commoditized foodstuffs, disaggregated into its component parts, and reassembled in a variety of products with virtually limitless shelf life are making us fat. The calorie in and out, energy balance hyperbole is industry contrived in order to reflect responsibility and blame those who move through their sea of products, the consumer. This same industry spends in excess of \$70 billion annually to market to children that their products are healthy and wholesome. Then that same industry turns around and proselytizes that it is an individual's and parent's responsibility to make better choices. Meanwhile, Coco Puffs are considered a heart healthy food

³¹³ Noam N. Levey, and Anna Gorman July 10, "We're Exercising More but Still Fighting Obesity, Study Shows." Los Angeles Times. July 10, 2013. Accessed August 03, 2013. <http://www.latimes.com/news/local/la-me-fitness-20130711,0,5123136.story>.

³¹⁴ Traci, A Mann, Janet Tomiyama, Erika Westling, Ann-Marie Lew, Barbra Samuels, and Jason Chatman, "Medicare's Search for Effective Obesity Treatments: Diets Are Not the Answer." American Psychologist 62, no. 3 (April/May 2007): 220–33. doi:10.1037/0003-066X.62.3.220.

because it has “whole grain” and packed with key vitamins and minerals. The charade is only masked by the Kafkaesque illusions of advocacy.

Everywhere a consumer turns there is a group of advocacy association that appears to be representing the consumers interest. Nothing could be further from the truth. Imagine the hypocrisy of the American Diabetic Association (ADA) partnering with Kraft foods, General Mills, Smuckers, and Heinz for the betterment of the diabetic community? The very product these companies produce and distribute that have been directly linked for having a role in the cause of obesity and diabetes also provides funding to an organization that strives to protect and advise customers’ about diabetes? In any other industry, that is malfeasance. In the food industry, that is good governance and corporate responsibility.

What if corporations, with the help of legislators and lobbyists, knowingly and deliberately sought to make people fatter so they would eat more? We are a nation of overfed and undernourished citizens.³¹⁵ Dr. Susan Linn in her book Consuming Kids³¹⁶ discusses the idea of cradle to grave branding, making consumers for life to perpetuate the corporate stockholders revenue streams. It discusses the \$15 billion marketing juggernaut aimed our kids and how corporations are in a fight to create consumers forever. It also breached in Brandwashed; Tricks Companies Use to Manipulate Our Minds and Persuade Us to Buy by Martin Lindstrom.³¹⁷ Companies are competing for our children prior to birth in hopes to maintain revenue streams. One is left to conclude that the neither unintended nor recognized consequence of our economic way of life is potentially compromising America in the long term.

Our dietary guidelines do not now nor have they ever worked. The low fat, high carbohydrate dietary guidelines that became doctrinal in the 1980s and 1990s

³¹⁵ “Overfed and Undernourished: Nutrient Deficiency in Our Modern Diet,” Mother Earth News. Accessed July 27, 2013. <http://www.motherearthnews.com/natural-health/nutrient-deficiency-zm0z13jjzmat.aspx>.

³¹⁶ Susan Linn, *Consuming Kids: Protecting Our Children from the Onslaught of Marketing and Advertising*. New York: Anchor Books, 2005.

³¹⁷ Martin Lindström, *Brandwashed: Tricks Companies Use to Manipulate Our Minds and Persuade Us to Buy*. New York: Crown Business, 2011.

demonstrated the zenith of oversimplified, decontextualized, and exaggerated interpretation of dietary fat being the culprit of obesity. (Scrinis, 7)

The low calorie, low fat, high carbohydrate mantra has failed and is measured by over 100,000,000 plus Americans being obese.

Machines do not fight wars, people do.³¹⁸

Even with the technological marvels and force projection capabilities of the United States changing, the likelihood of a system administration force³¹⁹ or service provider force is still labor intensive. Our nation is projected to grow and also change demographically over the next 30 years with additional data suggesting that by 2030 one of every two Americans will be obese. And our largest growing demography, Latin Americans, specifically Mexicans, have eclipsed the United States as the world's fattest nation, albeit by a tenth of a percentage point.³²⁰ Is America's influence so powerful that it has affected its neighbor to the South?³²¹

If our immigrant population and our current population continue this path of obesity with no interdiction in sight, we will effectively run out of available recruits, soldiers, sailors, airmen, and Marines, firefighters, law enforcement, and emergency responders. In a nation who projects a transition from a mercantile/manufacturing economy to a service economy, who will provide those services and protection from a host of threats, crises', and other interruptions? How will this nation be able to economically survive the spiraling cost of health care, already projected at nearly a trillion dollars annually?

³¹⁸ "U.S. Military Reform After Operation Desert Storm House Armed Services Committee," CSPAN. April 30, 1991. <http://www.c-spanvideo.org/program/AfterO>.

³¹⁹ Thomas P. M. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-first Century*. New York: G.P. Putnam's Sons, 2004.

³²⁰ GTY Mexico Obese Nt 130709 16x9 608 Mexico Gains on America to Top Globesity, "Mexico Gains on America to Top 'Globesity' List." ABC News. July 10, 2013. Accessed August 03, 2013. <http://abcnews.go.com/blogs/health/2013/07/10/mexico-gains-on-america-to-top-globesity-list/>.

³²¹ John D Sutter, "Blame the U.S. for Mexico Obesity?" CNN. July 13, 2013. Accessed August 03, 2013. <http://www.cnn.com/2013/07/17/opinion/sutter-mexico-obesity/index.html>.

And how does obesity, poverty, education, and geography interweave? With 20% of all high school graduates scoring too low on the Armed Services Vocational Aptitude Battery (ASVAB)³²² to serve also coming from states with the most obesity and most poverty, one can draw a very loose conclusion that there is a relationship between, obesity, poverty, education and ability to serve. Obesity impacts military readiness, potential readiness, and young men and women across the board. It is decaying our future.

If the current convergence of obesity, industrial food production, corporate ignorance, and legislative malaise continues, this nation will be in significant danger. Our ability to project force, protect our interests and homeland, and our way of life will be severely impacted. The effects of obesity are serious and a national and homeland security issue. We have done a moral disservice to the citizens of this country by labeling them lazy and sloth like. The fact that corporate America has strong indications that their products are making Americans obese, and that our legislators have turned a blind eye, is worse than merely feigning ignorance.

We speak in stark terms about service interruption, strategic petroleum reserves, a variety of ills and pandemics, and yet before our eyes, our most valuable resource, people, are being removed from service in any number of ways. How then can obesity and its impact not be a National and homeland security issue?

In a series of policy decisions coupled with unintended consequences and system adaptations, the United States of America, once the beacon of the world full of opportunity, robust citizens, and zeal have rendered themselves sick, fat, and with a life expectancy lower than the previous generation—a first for this nation. The facts are clear and unimpeachable. Our system has failed and leaders, both politically and corporately must take ownership of this problem immediately, if there is hope to remedy the failed policies and ill-fated decisions of years gone by. We must change, now.

³²² Christina Theokas, “Shut Out of the Military; Today’s High School Education Doesn’t Mean You’re Ready for Today’s Army.” www.edtrust.org. December 2010.
http://www.edtrust.org/sites/edtrust.org/files/publications/files/ASVAB_4.pdf.

B. RECOMMENDATIONS

We have the capability of making a substantive change in our resilience, readiness, and capability.

Our food industry can adapt. But in order for that adaptation to be effective and maintain economic potency, there must be a paradigm shift in our approach to eating and what we believe has transformed our condition and state. It is possible to curb obesity with changes in our food system, and there is money to be made. But, it is not the food industries' mission to change. It is the mission of the medical, political, and academic professions to admit defeat, admit erroneous information may have exacerbated a situation, and that the guidance they provided was wrong.

It has also been pointed out previously in this paper that 75% of first responders are obese.

There are some first responders realizing that a dietary change may be the key to their performance and mitigating risk factors associated with a high carbohydrate diet. Reno Police Department, under the command of Steve Pitts has adapted a low carbohydrate dietary approach to improve risk factors of their personnel.

The Reno Police Department (RPD) has partnered with several experts and advocates in Paleolithic/low carbohydrate diets to develop a resilience initiative to address the many risk factors impacting their personnel. The risk factors impacting law enforcement personnel are not only costly in the quality of life for those serving and their families, it is very costly in health care and medical retirement costs.

Interestingly, the program in Reno has examined and developed solutions that could be applied to the obesity epidemic impacting society as a whole. In young adults, preventing insulin resistance is predicted to prevent 42% of myocardial infarctions. In the State of Nevada, a workman's compensation claim for heart or other related illnesses cost approximately \$1.2 million per impacted employee. The up-front costs for recognizing and addressing this metabolic challenge pales in comparison to the incurred treatment costs. The Return on Investment (ROI) is estimated by Reno to be upwards of 20:1.

Initially, fifteen police officers participated in the program. Of those fifteen, nine of those officers were initially described as “high risk.” That is consistent with previous data provided suggesting roughly two-thirds of the population are metabolically corrupted. Following the three month analysis, the fifteen officers were re-evaluated, and we learned that the nine “high risk” officers had reduced their risk factors significantly through dietary change, awareness, and eschewing the conventional wisdom, as it related to wellness.

Early iterations of the program followed standard American Dietetic Association guidelines, which endorse a high carbohydrate, low fat, grain based diet. Advanced testing exposed the weakness of this dietary approach, as it failed to improve blood lipid parameters and frequently worsened insulin resistance scores while elevating triglycerides and decreasing HDL cholesterol.

For the past several years, Reno has employed a Paleo/Low-Carb Dietary Intervention, which has consistently improved markers of systemic inflammation, insulin resistance, and body composition. Although controversial in dietetics circles, the gold standard of medical science called the Randomized Controlled Trial (RCT) has shown a Paleo/Low-Carb approach to be superior in improving health.

While this is not a large population to make a complete assessment, this return or change in dietary intake has rendered favorable results for a once at risk population.

There are also critical skill operators within the Special Operations Community who adhere to a low carbohydrate, high fat/protein whole food program as a means of recovery and performance maintenance. There are also world class athletes, coaches, and academics that are moving from the carbohydrate loading preparation methodology to a ketogenic preparation methodology.

The realization must be made that more than 100 million Americans are overweight and another 100 million Americans are obese. That is a staggering number and almost unimaginable. And the dietary guidelines, the research that supports them, and the food industry that fuels it are wrong.

Perhaps it is time to recognize that our dietary guidelines are inherently flawed. Perhaps we should entertain and adopt the French Paradox.³²³ The French Paradox is the epidemiological observation that French people have a relatively low incidence of coronary heart disease (CHD) and obesity in spite of consuming large amounts of fat, particularly saturated fat in their diets.³²⁴ The paradox of course is that consumption of such fats is a risk factor for CHD. If our dietary guidelines are correct, then the French ought to have a higher rate of CHD than comparable countries where the per capita consumption of such fats is lower. They do not.

The French paradox implies two important possibilities. The first is that the hypothesis linking saturated fats to CHD is not completely valid (or, at the extreme, is entirely invalid). And as previously discussed, the French consume on average an equivalent amount of calories as Americans.

We should also examine the historical significance of when and how foods were demonized. For example, we have been told that beef and its fat are coronary heart disease accelerators. Perhaps that is not completely accurate. George Mann, a former professor of medicine and biochemistry at Vanderbilt University, and one time codirector of the Framingham Study,³²⁵ states unequivocally that fat and cholesterol in the diet is not the cause of coronary heart disease. He further states that this myth is the greatest ‘scientific’ deception of the century, and perhaps any century.”³²⁶ That myth was the impetus of the obesity epidemic.

The idea here is this; all inputs and foodstuffs should be examined objectively, not simply because a lobby, political, or pseudo-scientific disposition renders a product unfit. This data could be wrong and it does fly in the face of conventional wisdom. However,

³²³ “French Paradox,” Wikipedia. July 24, 2013. Accessed August 03, 2013.
http://en.wikipedia.org/wiki/French_paradox.

³²⁴ J. Ferrieres (2004), “The French Paradox; Lessons for other countries.” *Heart* 90 (1): 107–111.
[doi:10.1136/heart.90.1.107](https://doi.org/10.1136/heart.90.1.107). [PMC 1768013](https://pubmed.ncbi.nlm.nih.gov/1768013/). [PMID 14676260](https://pubmed.ncbi.nlm.nih.gov/14676260/).

³²⁵ “Framingham Heart Study,” Accessed September 04, 2013.
<http://www.framinghamheartstudy.org/>.

³²⁶ George V. Mann, Coronary Heart Disease - “Doing the Wrong Things.” *Nutrition Today* 1985; July/August: 12–14.

what if the data is not wrong but instead the dogma about fat and diet are? It must be considered.

The nation should also consider revisiting our dietary regimen of the early 1960s; that era being prior to the slew of policy and business decisions that led us here. Our diet, or simply what we eat, should be whole foods, grown without excessive chemicals and regionally distributed to add nodal resilience and economy. Our diet should be comprised of fats, those that occur in nature and not created in a laboratory. A variety of vegetables and proteins, preferably not a Concentrated Animal Feeding Operation (CAFO) and industrially grown with limited, seasonal fruits, low in glycemic index and as little of any processed or modified GMO grains. There is a means to return the nation to a healthier food state and also increase local revenue and distribute the growth, harvest, and distribution regionally, thereby, adding nodes of capability and regional variety.

Disable as best possible the lobbying infrastructures of the food industry. While highly unlikely, a more adroit and acute awareness must be gained by citizens on how lobbyists are funded and what their role actually is. Perhaps the possibility of a representative republic holding leaders and lobbyists is an inherent necessity if this Nation is to be safe and secure.

Recognize the obesity issue as a public health one and stop blaming the American public. Leadership is sorely lacking in this crisis because to implicate a suspect would also indict many advocates. Public health is part of resilience. In order for a nation to defend itself and also absorb crisis, it must be nimble, robust, steeped in a reservoir of “candorism” and have economic and material surplus. We have little of that now.

This thesis was an attempt to demonstrate that obesity, its causes, its effects, and its impacts are undermining homeland and national security because it directly impacts over 100,000,000 Americans. Further still, this thesis presented the premise that homeland security is more than preventing terrorism. In order to maintain a resilient, robust, nimble, and persevering nation, we must observe. We must see that anything that denigrates or changes the homeostasis of the populous in a negative light, disrupts the mean expectation of safety, security, and wellness, and has negative outcomes could be

construed as a homeland security issue. Our health and wellness is before our eyes eroding.

We must try something different. Diets low in carbohydrates used to be prophylaxis for diabetics and those who were obese. No longer. Perhaps it is time to throw all the dogma out the window and begin anew by returning to what appears to be a scientifically supported hypothesis; carbohydrates and refined foods are making us obese, not dietary fat. The Nation, its safety, its security, its citizens, and its economy are in perilous proximity to reaching a point of no return. Leadership must be exercised and risks taken and identified, if we are to fulfill the potential our grandparents and forefathers sacrificed so much for.

Society will develop a new kind of servitude which covers the surface of society with a network of complicated rules, through which the most original minds and the most energetic characters cannot penetrate. It does not tyrannise but it compresses, enervates, extinguishes, and stupefies a people, till each nation is reduced to nothing better than a flock of timid and industrious animals, of which the government is the shepherd.

—Alexis de Tocqueville, *Democracy of America*
Volume II, Book 4, Chapter 6

We as a nation can fix this problem established by a set of circumstances, economic drivers, and national myopia on self-enrichment and corporate machinations. The power of an insurgency in reality and metaphor is that it only takes a small group of people to decide to refuse to be shepherded. Self-determination and the challenge of tyranny in any state or circumstance can be cut by trailblazers and return the nation to a course of self-determination and prosperity. Obesity is a homeland and national security issue. Let us unite and defeat the enemy of our future.

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